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Randall, G. P.

A HAND BOOK OF DESIGNS,

CONTAINING

Plans in Perspective

OF

COURT HOUSES, UNIVERSITIES,

Academies, School Houses, Churches, Dwellings, Etc.,

AND

SUGGESTIONS RELATIVE TO THEIR CONSTRUCTION,
HEATING AND VENTILATION.

By G. P. RANDALL, Architect.

FIFTH EDITION,—REVISED.

CHICAGO:
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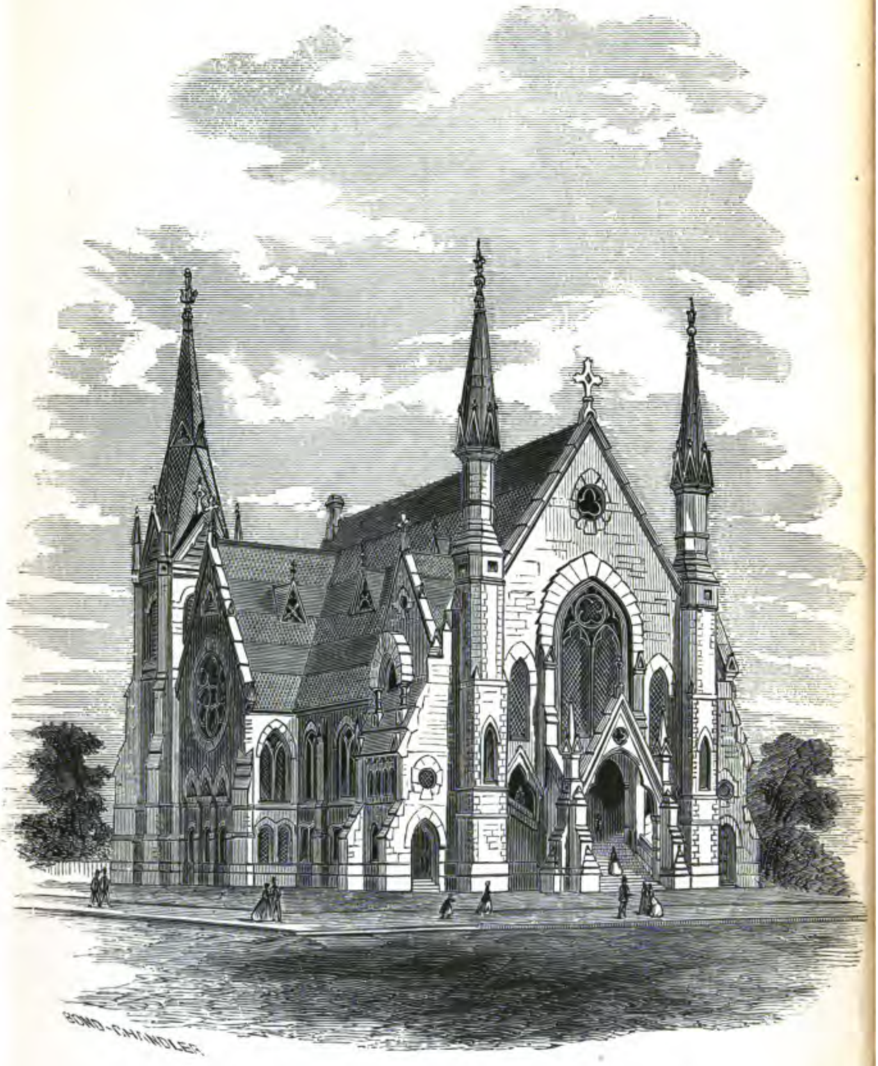

CHURCH. - - - G. P. RANDALL, Architect.

No. 1.

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BY G. P. RANDALL, ARCHITECT.

CHICAGO:
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Entered, according to Act of Congress, in the year 1868,
By G. P. RANDALL,
In the Clerk's Office of the District Court of the United States for the Northern District of Illinois.

TO THE PUBLIC.

I HAVE prepared this little pamphlet after the manner and style of my "Descriptive and Illustrative Catalogue," published some two years since, and, like that, it will be distributed among my friends and patrons, for the purpose of advertising my business; and as it has been gotten up at considerable expense, I shall be obliged to those to whom they may be sent, if, having no use for them themselves, they will hand them to their friends who are going to build, or send me the address of such parties, that I may send them one and confer with them direct.

The views of buildings here given are those of my own designing, some of which are built, and others are building and to be built. Should it be asked why I have not given the floor plans, showing their internal arrangement, the reply is that they would be of but little, if any, service to the reader, as they, as well as the views here shown, are the property of the architect, with which he does not part without compensation, and those who use them are liable to him for them to the. same extent as though the plans were ordered of him. I have, therefore, omitted their insertion, but will send a copy of them to any one who is about to build, and will become responsible for their proper use.

In presenting these designs, I have selected such as will be most likely to be serviceable to parties in the country in determining what they will build, but they are by no means to be regarded as the best that can be made, nor the best that I have in my office.

In some cases the design of a particular building is selected on account of its geographical location; others, and particularly the churches, were many of them selected on account of their having been designed with a special reference to economy in building; whereas, were I presenting them as models of architecture, without reference to cost, many of them would have been quite unlike what they now are.

Individuals or committees who desire something unique, odd, or elegant, or all these combined, can have such designs, by signifying their desire to do so, and willingness to incur the expense of erecting such buildings.

Again, parties in looking over the limited number of illustrations here presented, as, for instance, those for dwellings, of which there are but two given, may be disappointed in not finding their ideal house among the number. To all such I can only say that there can rarely be found any two persons who want the same design for a dwelling, or two committees who want the same design for a church. There are as many varieties of tastes as there are people; and to expect that one individual will be satisfied with a design made for another of different tastes and habits of life, is simply to expect an impossibility. My object is to give a few designs of such a nature as will indicate something of the character of my ordinary work, leaving it to those who desire my services to judge for themselves, whether, if they honor me with their orders, I shall be able to fill them in a satisfactory manner.

The illustrations here given are from engravings made by BOND & CHANDLER, of this city, than whom there are none better here.

Address,

G. P. RANDALL, *Architect*,
No. 20 Portland Block, Chicago, Ill.

THE NECESSITY
OF
HAVING PLANS IN BUILDING,
AND
HOW TO OBTAIN THEM.

As a great proportion of the people outside of the large cities and towns are comparatively unacquainted with building, and especially with the use and value of drawings in the construction of buildings, I propose to suggest some of the advantages arising therefrom, and will also point out the necessary preliminary steps to be taken in employing an architect.

THE USE OF DRAWINGS.

To the educated architect, or business man of intelligence, it would seem like a waste of paper and ink, to attempt to show that buildings can not be properly built without the aid of carefully made drawings; nevertheless, as there are thousands who have little or no knowledge of their use, I will endeavor to show what some of their advantages are, and the necessity for them.

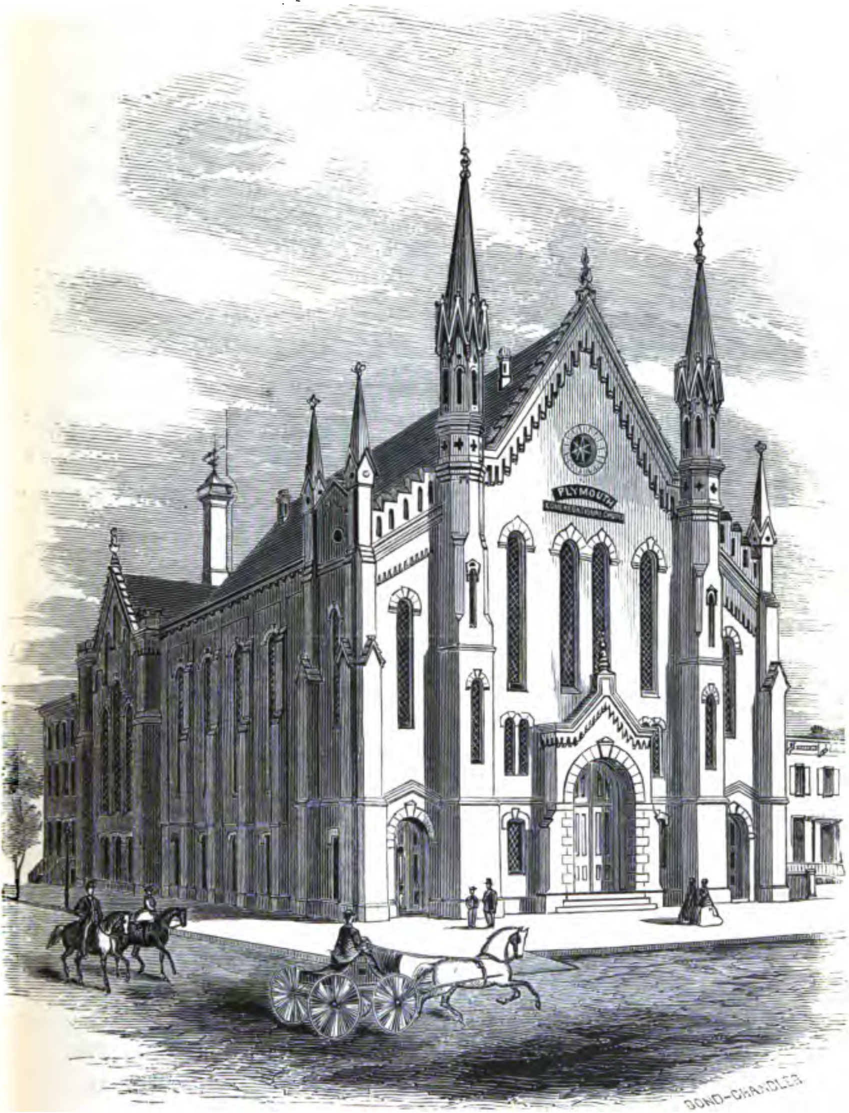
Before proceeding to do so, however, I desire most emphatically to caution the reader against confounding in his mind the idea of plans, as sometimes made by builders, with architectural drawings made by an architect, who is properly educated in his profession. As well might you employ a nurse to prescribe medicine for you when sick; or a butcher to amputate a limb, should you be so unfortunate as to lose one, as to employ a builder to make plans for your building.

A proper knowledge of the principles of architecture, and the art of building, is only obtained by long years of incessant study, of books which are very rare and difficult to be obtained, which, together with the want of time, places it entirely beyond the reach of the mere practical builder to obtain a tithe of the knowledge of building which a good architect should have, who offers his services to the public as such.

People too often suppose that the making of a "picture" representing a building, is what constitutes a person an architect; but this is an error. There is many a mechanic or builder, who has, as any person may in a few leisure hours, acquired the use of drawing instruments and paint brushes so as to enable him to draw and color something that will resemble a building; while not one in twenty of such individuals, working in an architect's office all the time for five years, could attain a sufficient knowledge of the business to be able to make a set of drawings for the commonest kind of a building, so that they should be ready for use, without being subjected to the most vigilant scrutiny of the principal of the office.

The requisite qualifications of an architect are: first, to know how to design well, and for this he must have a large endowment of mechanical genius; at least a respectable education; and a thorough knowledge of architecture in its varied styles, as practiced in the different countries where it has flourished in past ages.

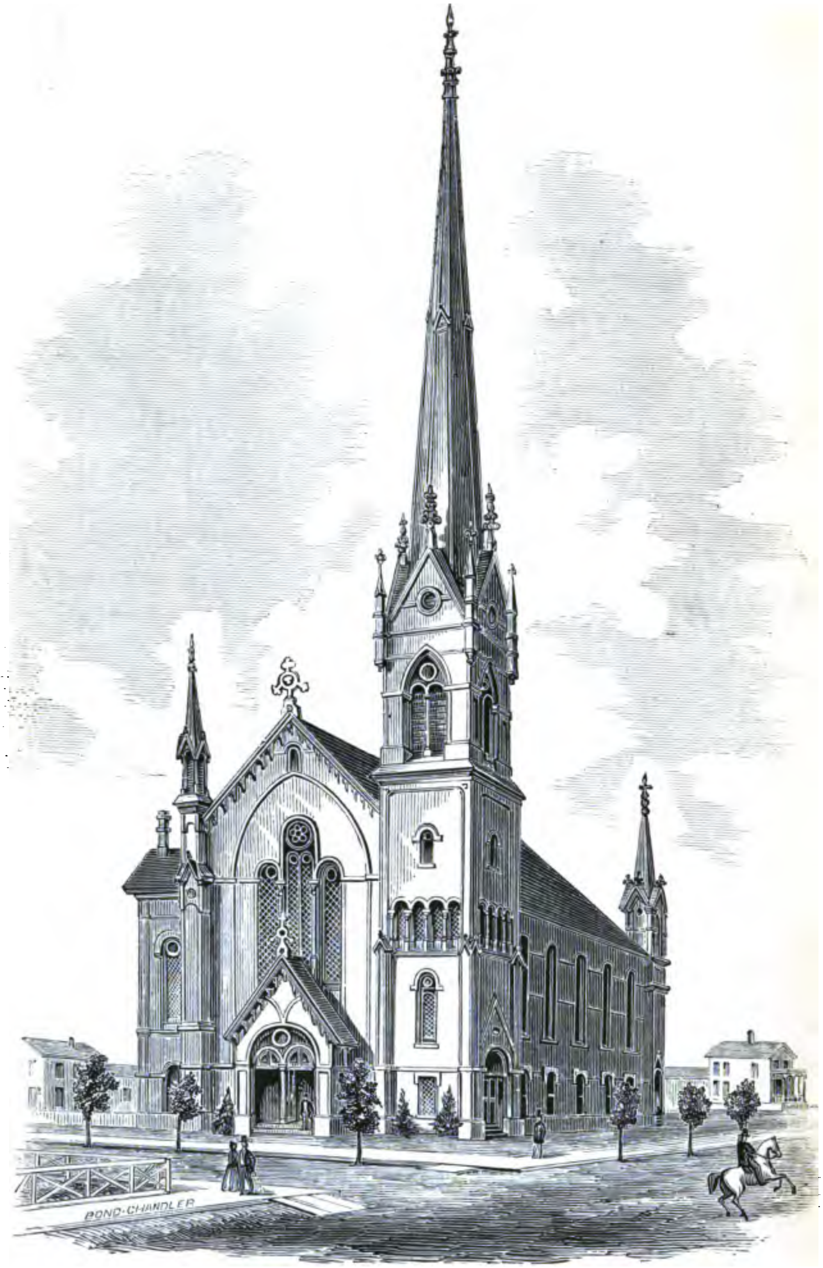
His next, and a very essential qualification, is a thorough knowledge of the construction, nature and strength of the materials he has to use, and the numerous and ever varying appliances that may be brought into requisition for meeting



PLYMOUTH CONGREGATIONAL CHURCH, CHICAGO.

G. P. RANDALL, ARCHITECT.

No. 2.



EIGHTH PRESBYTERIAN CHURCH, CHICAGO. - - - G. P. RANDALL, ARCHITECT

No. 3.

and obviating the difficulties thrown in his way to the carrying out of the designs which his genius has conceived. If he be deficient in this respect, though he may design ever so magnificently, his magnificent designs become only the more magnificent failures. Therefore it is, that an architect should possess a thorough knowledge of this important branch of his profession, for without it he can do nothing.

Again, it should require no demonstration to show that he who is continually designing buildings; for instance, churches, colleges, school-houses, etc., must, of necessity, be better qualified to determine all the necessary and multifarious arrangements required, and adapt them to the wants of those who employ him, with a greater degree of success, than he who only occasionally designs one. A simple suggestion from a competent architect, is sometimes worth all a set of drawings would cost.

Having, as I trust, convinced the reader that he should, before commencing to build, obtain carefully prepared designs and drawings of his intended building, I will endeavor to point out some of the advantages to be gained by it, beyond that of simply obtaining a good design.

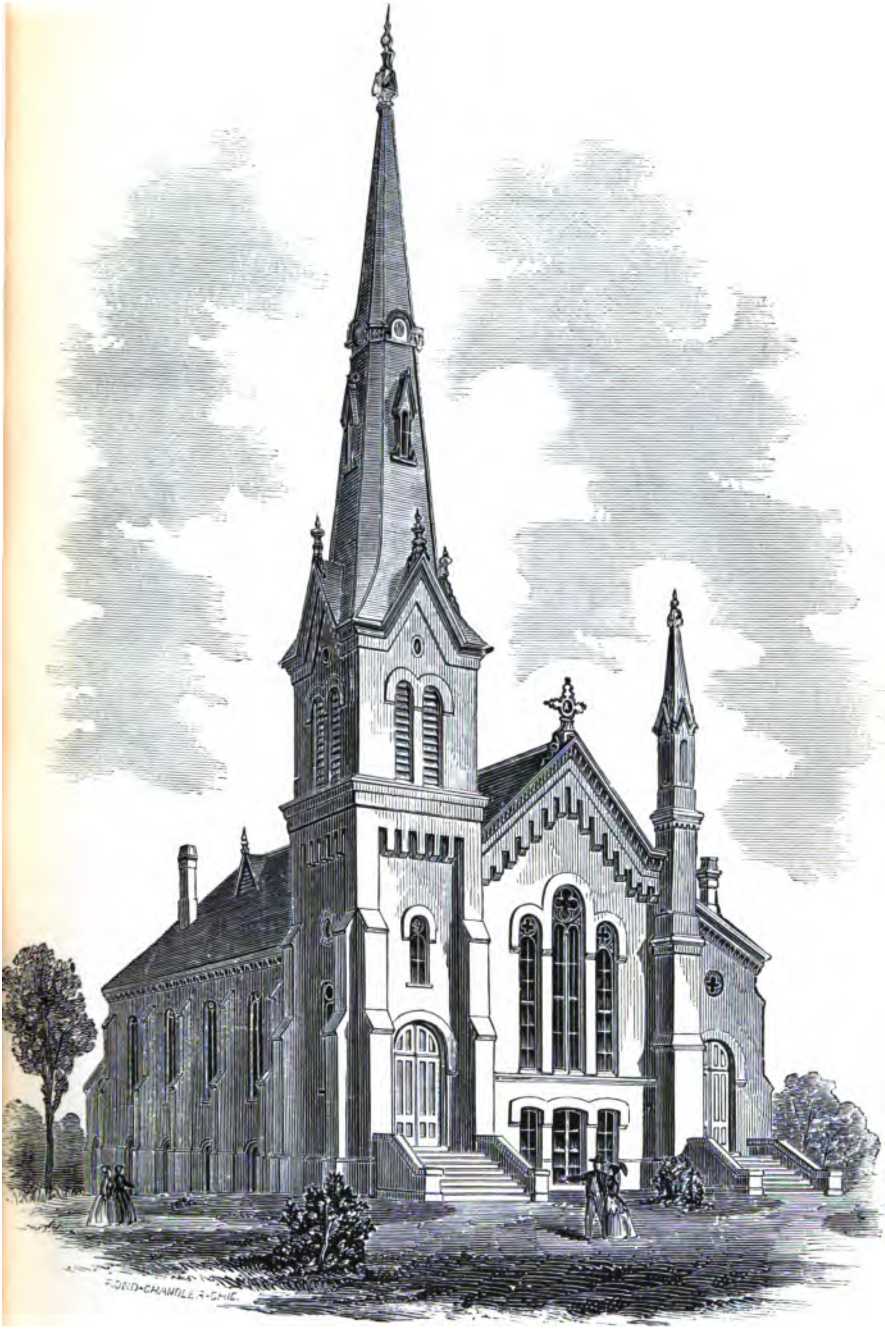
In the first place, no prudent man should think of building, until he knows what he is going to build; and how can he know, until he can see his proposed building and all its parts, delineated on paper? When so delineated, he has an opportunity to examine it as minutely as though the building itself were before him; and before proceeding with the work, can make such modifications in the arrangements, as will bring it to conform to his views; when without such plans, he goes on with the work, as it were, blindfolded, and only sees the defects when it is too late to correct them, except at a heavy expense in extras, which would, perhaps, have cost him as much as a good set of plans, by the use of which, such extras might have been avoided.

Another and very essential reason why a person should never undertake to build without plans, is, that it is very difficult to build by contract, where you have nothing for a guide as to the manner of doing the work; for a *written* description of a building can scarcely be made, that may not be differently construed by different individuals, and he who attempts to build thus, places himself entirely at the mercy of his builder. I will venture the assertion that no person, not even an architect, can describe a building proposed, without plans, sufficiently clear, as that it may not be built for a tenth, if not a twentieth, less than it should cost, and still the builder keep so far within the margin of his contract, as not to make himself liable for a breach of that instrument.

Nothing is more common than to hear an individual remark, after having made one trial at building without plans and specifications, that he will never attempt so foolish a thing again. And why should this not be so? How can it be otherwise than true, that he who devotes his whole time and study to a given subject, must of necessity be acquainted with the subject, to an extent that no other person can be.

HOW SHOULD AN ARCHITECT BE EMPLOYED?

It is sometimes the case, especially in the erection of public buildings, that architects are invited to submit plans in competition. This, however, is a pernicious way of obtaining a design, and would never be resorted to were its effects better understood by those seeking to avail themselves of it. In the first place, to enlist the best services and talent of an architect, it must be understood that he will be properly remunerated for such service, for nothing is truer, practically,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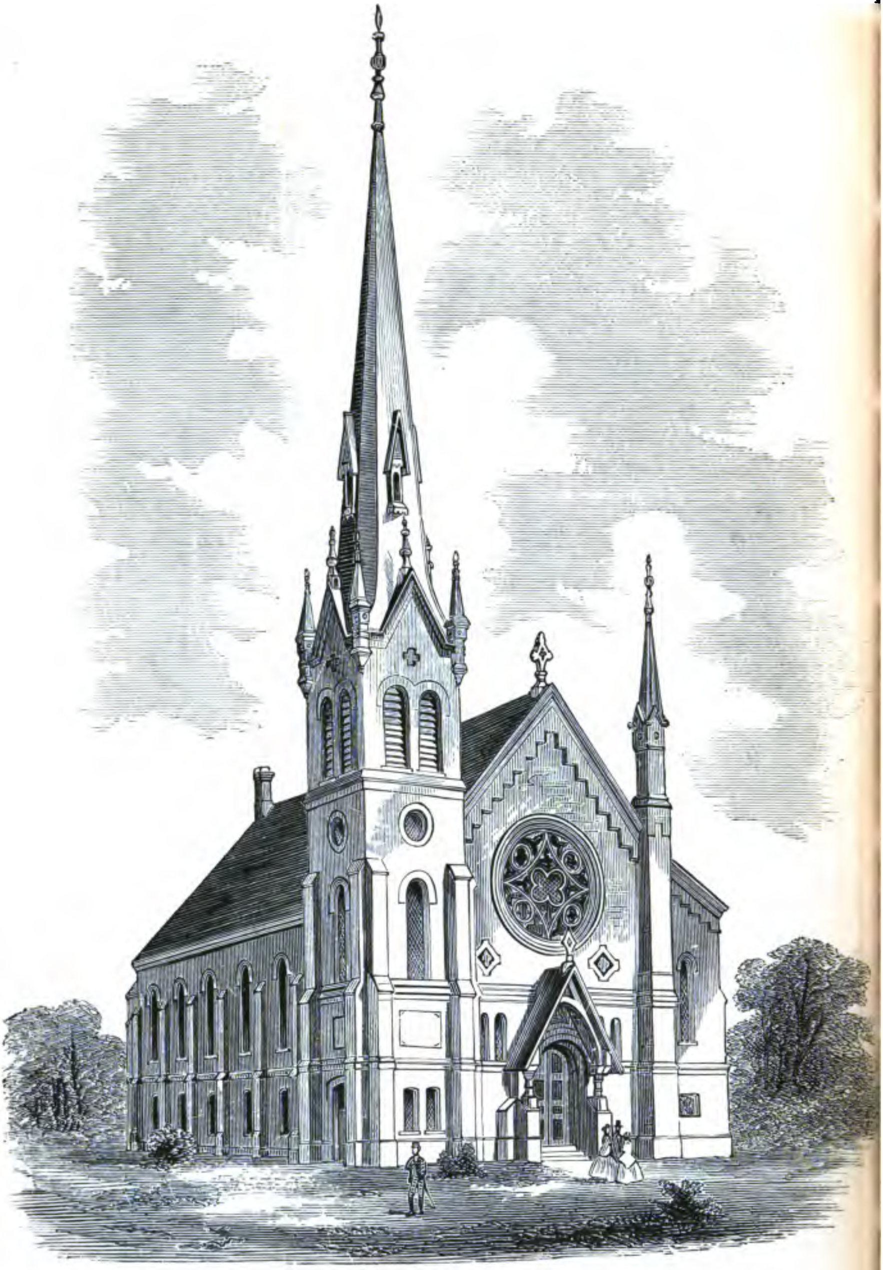
No. 4.



FIRST CONGREGATIONAL CHURCH, LA CROSSE, WIS.

G. P. RANDALL, ARCHITECT.

No. 5.

than the lawyer's maxim, "that advice not paid for is of little value," and no man of talent, and in business, will waste the time necessary to make a *good* design, when he stands, perhaps, but one chance in ten, of getting paid for his work. Again, the mere fact of a competition precludes the practicability, not to say possibility, of that free interchange of thought and ideas between the architect and his employer, which is absolutely necessary to a successful accomplishment of the task before him.

If you would have the combined genius of several architects, or wish to see what they would propose for your intended building, employ them to make *sketches*, at a moderate compensation, with the understanding that if their design shall be approved, they will be employed to complete the plans, and be paid the usual commission for their work.

But there are but few men of ability who will waste their time in a competition; and those who attempt to obtain plans in this way will only enlist the services of young men of limited experience, or broken down practitioners, whose want of ability or integrity has prevented them from securing the confidence of their fellow men to a sufficient extent to place them beyond the necessity of resorting to such means to obtain business. This is the general rule, though there may be honorable exceptions. For similar and other good reasons, if you would secure the best and most competent men as architects, select such as have been long established in their places of business.

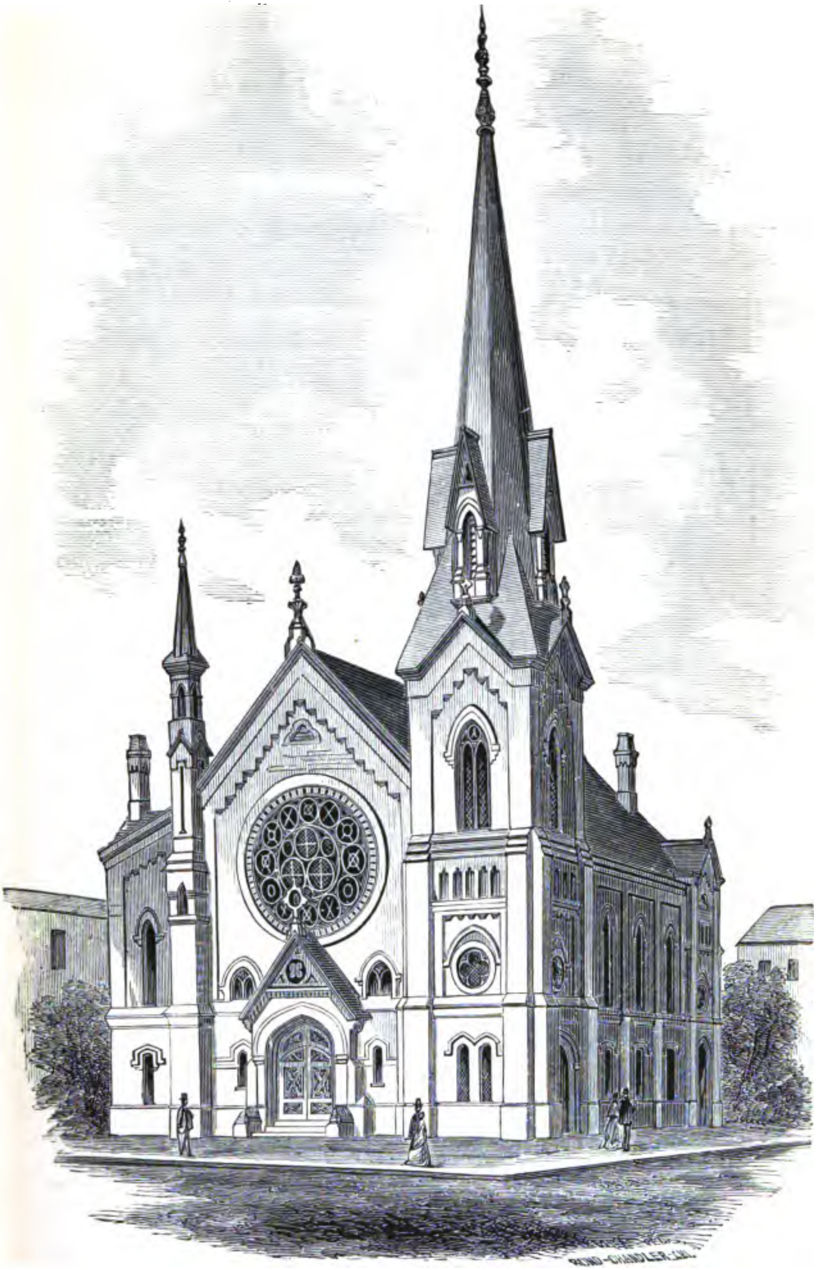
Another, and one of the worst features of obtaining designs in a competition, is, that there is so great an inducement held out for the practice of dishonesty on the part of the competitors; and in this, those who expect to be the gainers by obtaining a large amount of gratuitous labor from the architects, are often themselves pretty thoroughly victimized in the operation.

So long as the present organization of humanity exists, it is presumable that men will be found, who are willing to resort to any measures, however dishonorable, to carry a desired point; and, unfortunately, architects are not made an exception to the general rule; hence it is, that in utter disregard of the plainest principles of justice and honor, they will not hesitate to represent that a building may be built from *their* designs for *two-thirds* the amount they positively know it will cost, simply for the purpose of securing "a job," though, in doing so, they practice the most unwarrantable fraud upon those who are confiding in their integrity, and a shameful disregard of all principles of fair dealing between themselves and their professional brethren. If, of rather easy virtue, they may justify themselves by the plea that they are not employed, but only "prospecting," as miners would say, and that it is no breach of faith on their part, that they work for their own interest, and especially, as the other party is endeavoring to obtain from them their skill and labor without paying for it. Therefore, I should say, if you want the services of an architect, employ him, and pay him for such service.

PRELIMINARIES TO ORDERING PLANS.

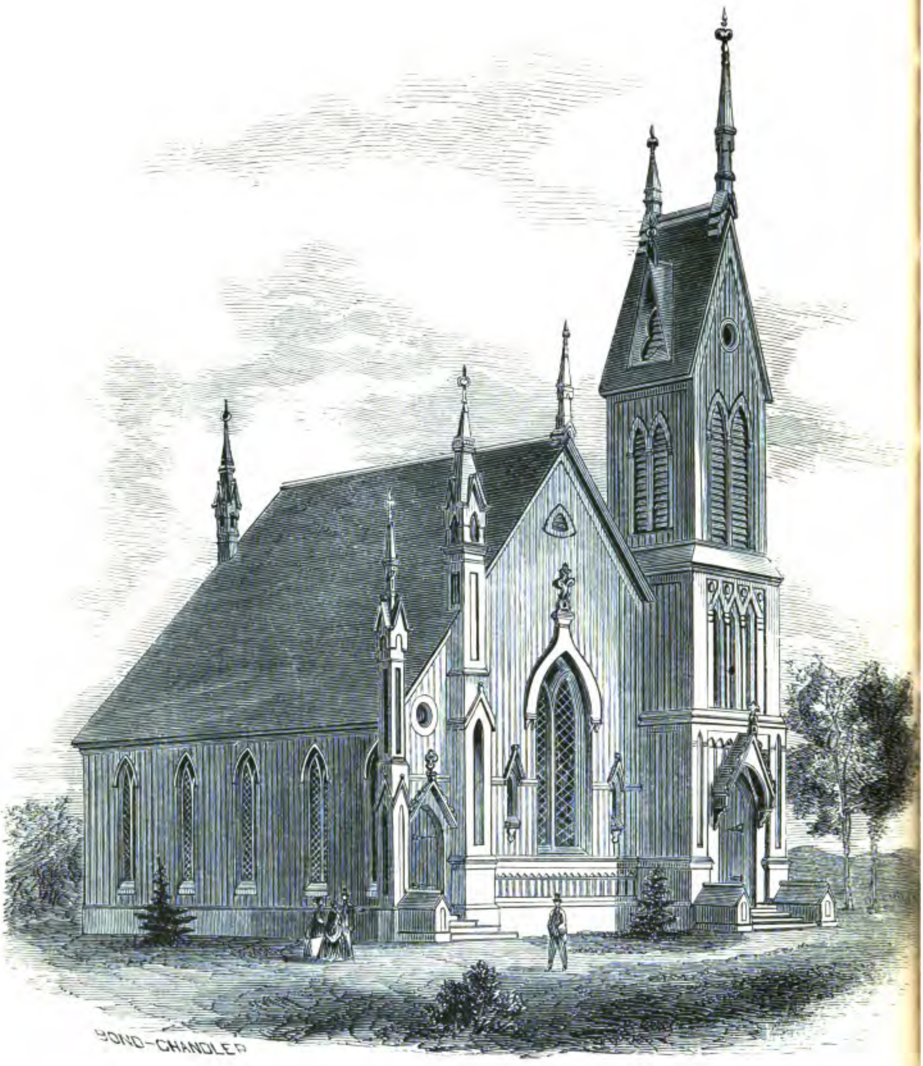
When plans are ordered by people living in the country, or when the architect can not see the site of the building, and confer with them in person, there are several matters of importance to be observed. For instance, if the plans wanted are for a school house, be particular to mention the number of pupils to be provided for; and if for a church, state how many sittings will be required.

Always mention of what material the building is to be



CITY CHURCH. - - - G. P. RANDALL, ARCHITECT.

No. 6.



COUNTRY OR SUBURBAN CHURCH.---G. P. RANDALL, ARCHITECT.

No. 7.

built, and if there is any doubt as to whether it should be brick, stone, or wood, leave this for the architect's opinion and advice.

He will want to know the position of the lot on which you propose to build, whether it be high or low as compared with the street and the adjacent lots; whether the soil is dry, or if not, whether susceptible of being drained; the nature of the soil; what points of compass the proposed building will front; whether it will have a street on more than one side, and which side or sides; what part of the building will be most conspicuous from the town and approaches; whether you have good gravel, sand, stone and brick, their nature and color; whether you have *pressed* brick; and it is well to state generally with what facilities these several materials may be obtained, and their cost at the site of the building.

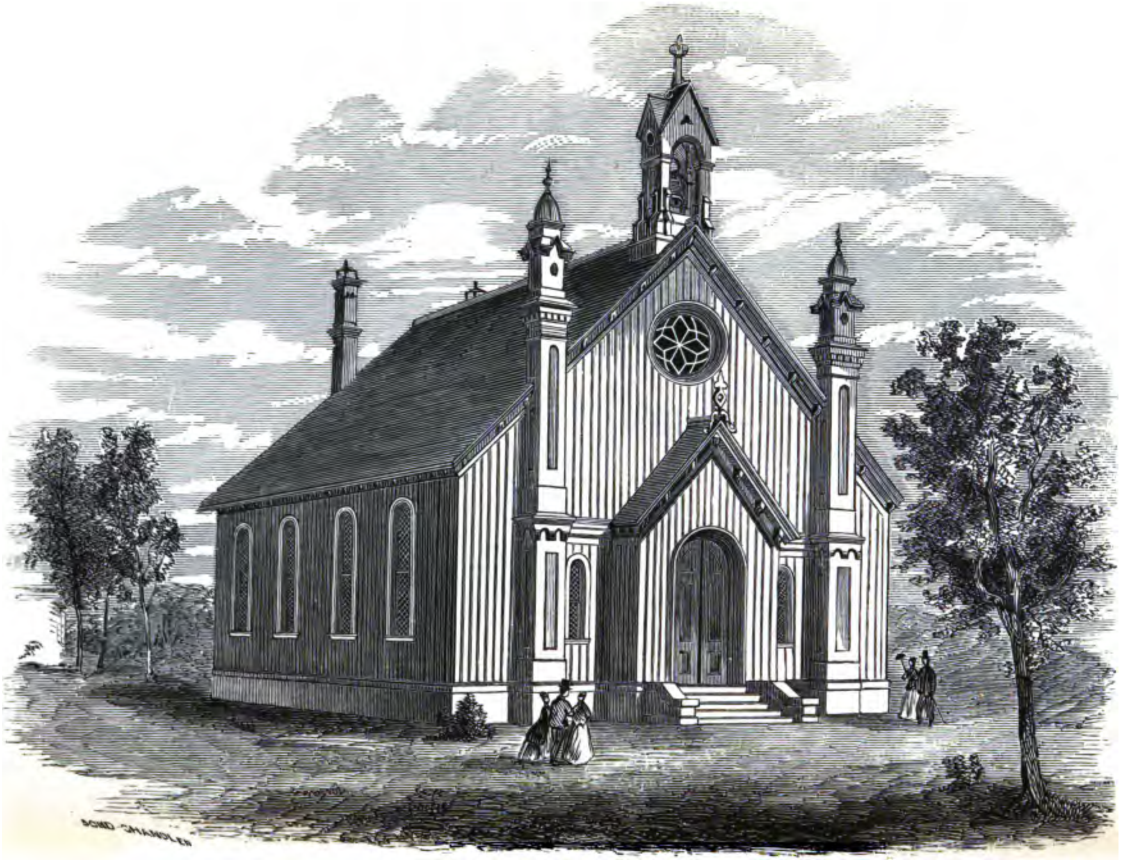
These particularities, to those not acquainted with the business, may seem to be unnecessary, but to the architect they are essential, and I might say, absolutely necessary, to enable him to make the best use of the means at his disposal. In giving an order for plans, it is well to make any suggestions that may occur to you as to style of building; if a dwelling house, as to size and number of rooms, and every thing that may aid in arriving at the point aimed at, that of making a good design. With these necessary data in hand, the architect will proceed to make a *design*, which we will suppose to mean the floor plans and elevations of the building, first drawing them in pencil, at which point they may be traced on thin paper, enclosed in an envelope, and sent to the parties for whom they are being made, for his or their inspection and acceptance, rejection or modification, as shall seem to them advisable.

If the design does not, in the main, meet the wishes of those for whom it is made, another will be made; but if it be generally correct, the employer suggests such modifications as will make it satisfactory, and the plans are then finished, in a proper manner, for practical use. Generally the architect does — and for all buildings of any importance, he always should — retain the original specifications and *scale* drawings, (plans, sections and elevations,) and if the work goes on, he makes copies of them for the builders, together with full and complete DETAIL DRAWINGS of all the masons' work; cut stone; carpenters' work; iron-smiths' work; and in short, drawings of every thing that is to be wrought and worked in the building.

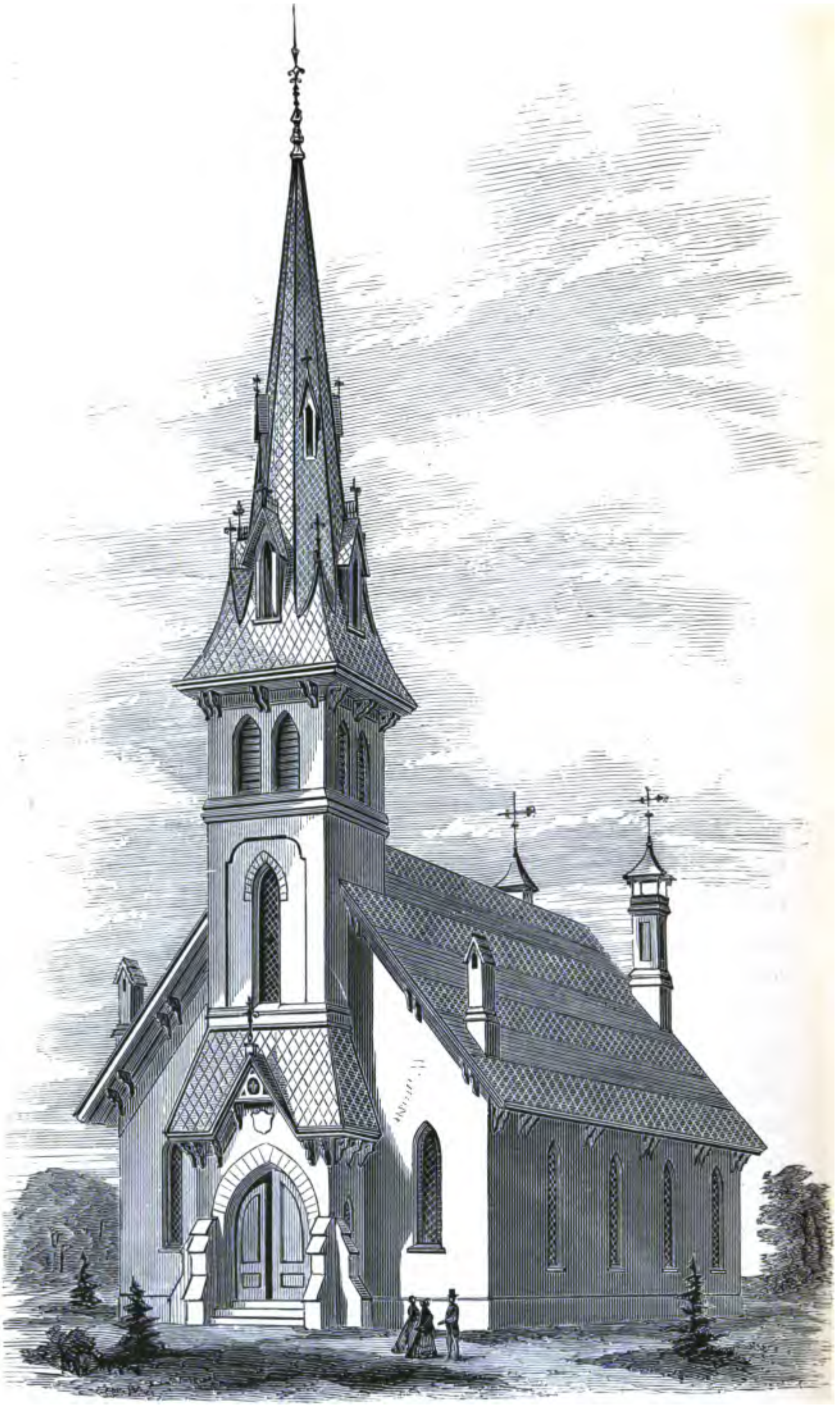
Most people, and especially those who are unacquainted with the business of an architect, have no adequate idea of the amount of labor to be performed, both physical and mental, in making a design and complete set of drawings for a good building. In the first place, it often requires days, weeks, and sometimes even months, of study, in the conception and working out of a design, so as to make it intelligible to others, before a single line of the final drawings shall be made.

Then every part must be accurately drawn to a scale, each part having a relative proportion to the building when built, and all the principal dimensions calculated mathematically, and figured accurately on the plans.

Next, detail drawings are to be made to an enlarged scale — and many of them full size — of every piece of cut stone, iron-work, wooden finishings, framings, etc., and all figured so that they shall correspond one with the other, and each fit its place in the building. Very often these different parts of the work are prepared in places hundreds of miles apart, yet the architect is expected to make his drawings with such an amount of accuracy, that the several parts shall go together almost without the sound of a



PRESBYTERIAN CHURCH, OLIVIA, PA. - - - G. P. RANDALL, Architect.



SUBURBAN CHURCH. - - - G. P. RANDALL, ARCHITECT.

No. 9.

hammer, as did the work on Solomon's Temple, under the direction of that Grand Architect, Hiram, "the widow's son." And reader, when you contemplate the numerous and varied parts and pieces of a building that have to be thus prepared by the architect with such minute accuracy; when you consider that every piece of cut-stone in a building in all the numerous parts and pieces of which it is composed—and sometimes there are many thousands such—must necessarily be drawn and figured to such a degree of accuracy that there shall not be the variation of an eighth of an inch in any one of them; then, and not till then, can you have a just appreciation of the labor and responsibility which necessarily attaches to the business of an architect. And this is no fine drawn fancy picture. It is a responsibility which he assumes, and which he is under every time he accepts an order to make plans for a building, increasing or decreasing, of course, with the magnitude of the work in hand. It is sometimes the case that an error of a clerk in misplacing a figure of dimensions of some important part; or of miscalculating, or erroneously figuring, the drawings for a valuable piece of cut-stone, or other laborious and expensive work, will involve a loss to him of hundreds of dollars. Hence, I repeat, that but very few persons have any correct idea of the care required and responsibility assumed in working out the design and drawings of a good building, and he can only avoid the consequences to himself of this responsibility, and the vexation and expense to his employer, which is sure to follow a neglect of this duty, by doing his work faithfully and well; and this he can not do unless he shall be properly remunerated for it.

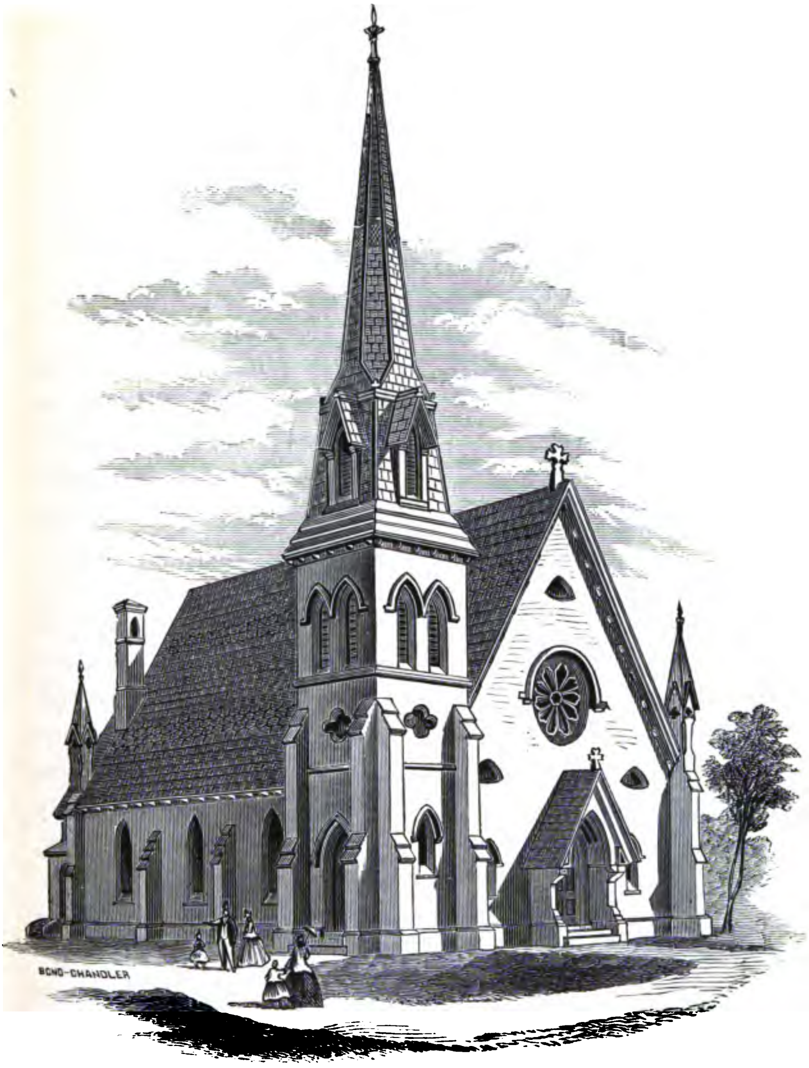
SOME OF THE DIFFICULTIES

OF

DESIGNING BUILDINGS.

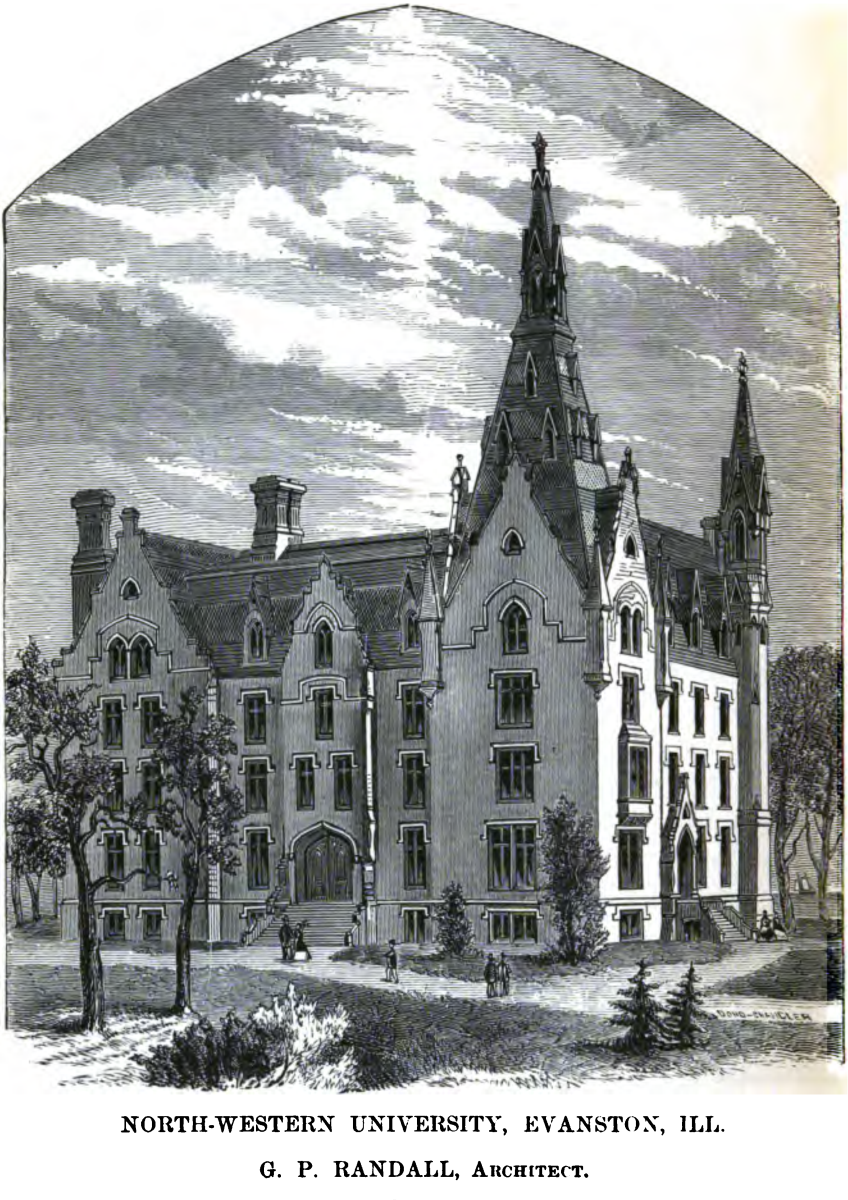
One of the greatest sources of evil with which an architect has to contend, is the difficulty in designing a building which shall have the character, capacity and style required by his client, and not exceed the intended cost; for it is notoriously true, that, in nineteen cases in every twenty, his client *expects* to build for about one-half or two-thirds what the building will actually cost. In the first place, the individual (or committee, as the case may be,) requires a given amount of space or room to meet the requirements for which the building is to be designed, and giving the necessary directions to his architect in reference to this important part, he finishes by saying that he expects to build the proposed building for a given sum, probably about half or two-thirds what it will actually cost. Now, what is the architect's duty in the premises?

If his services have been retained so that he is regularly in the employ and pay of his client, there can hardly be any doubt as to his duty, which should be to point out as clearly and intelligibly as he is able, the discrepancy that will probably arise between the desired and actual cost. Then his client has his option to reduce the cost of the building, by curtailing its dimensions or adopting a cheaper style, or otherwise.



COUNTRY CHURCH IN WISCONSIN. - - - G. P. RANDALL, Architect.

No. 10.



NORTH-WESTERN UNIVERSITY, EVANSTON, ILL.

G. P. RANDALL, ARCHITECT.

No. 11.

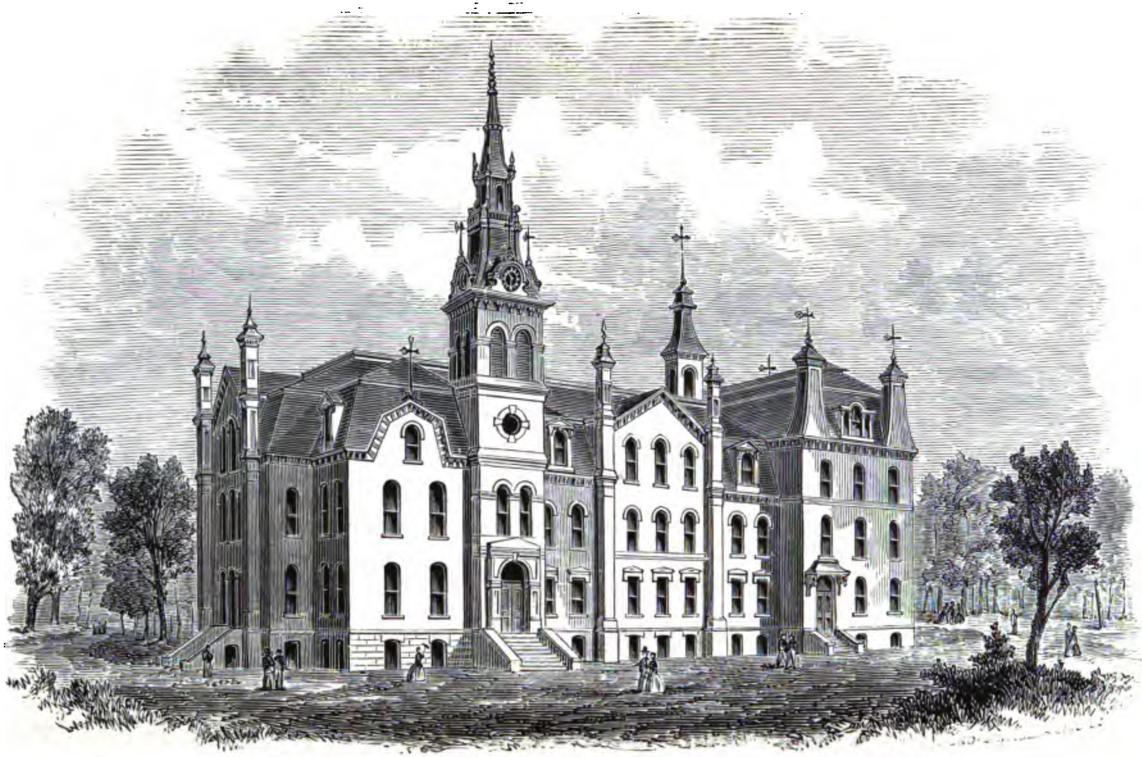
But here again there arises another difficulty, which is, that it is often, very often, the case that at the time of giving the order for plans, the client has but little, and his architect only a vague idea in embryo, of what the building is to be when designed and built; and hence has no reliable data from which to form an opinion as to its probable cost. He should be expected, therefore, to give only approximate estimates, subject to correction and revision when the designs are completed. Even then he can only give an opinion as to what *should be* the cost, his data for that opinion being the cost of similar buildings erected elsewhere, for he does not contract for the work himself, and the cost of it must necessarily depend very much on the judgment, or want of judgment, or the integrity of those who do contract for it. But this will seem less strange when it is known to others, as it is known to architects, that the bids from a dozen builders for almost any building costing, say fifty thousand dollars, will vary from the highest to the lowest, often as much as twenty or twenty-five thousand dollars, and in that proportion, and sometimes greater, whatever be the magnitude of the work. Again, for reasons not easily explained, at least in some cases, builders will bid for a contract, at nearly quite, if not double what would be a fair compensation for the proposed work. Such cases occur not unfrequently, and as they are matters which the architect can not control, he does not deem himself responsible for them, though they are often a source of annoyance to him.

If the architect *has not* been regularly retained or employed, it is notoriously true, and

> "'Tis true, 'tis pity,
> And pity tis, 'tis true,"

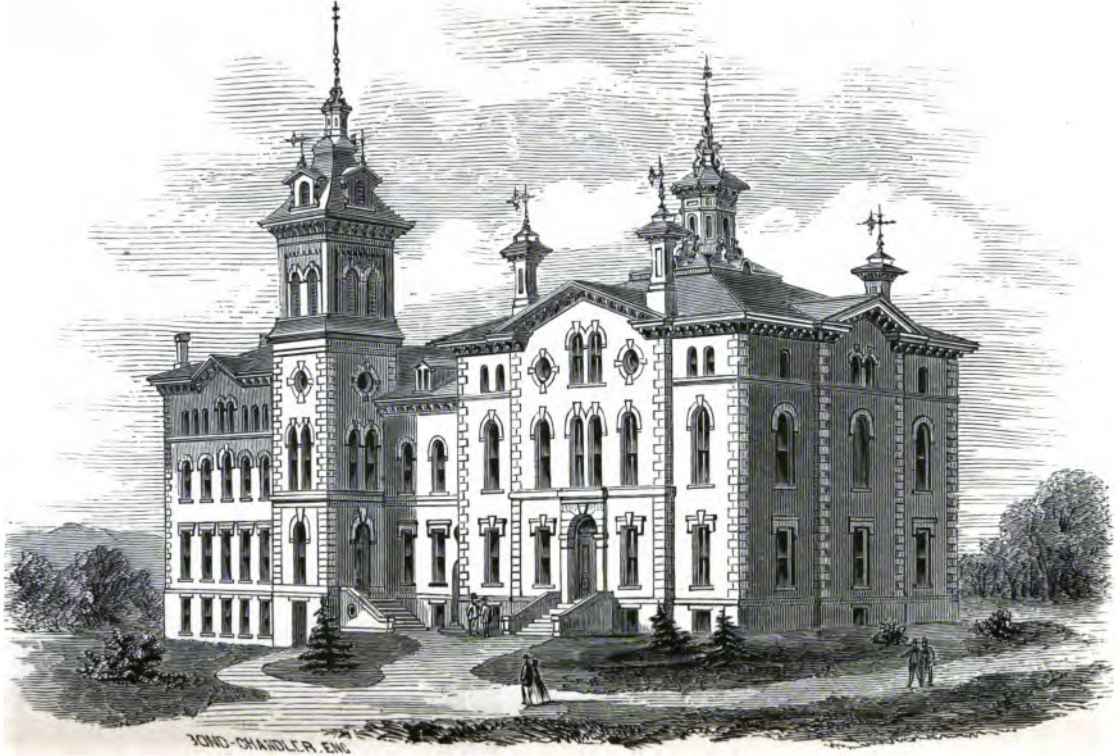
that a truthful, honest statement of the probable cost of a building *would often lose him an order for the work*, so prone are people to be humbugged; for, however much disposed he should be to deal fairly with those who might intend to employ him, it will accord with the observation of every architect, that persons seeking for such service will almost invariably confer their favors upon those who will tell the most plausible story as to cost, be it true or false. If not employed, but only seeking to secure employment, at the same time that the other party is endeavoring to obtain whatever information he or they can gratuitously, it is not strange, considering the weakness of poor human nature, if he is not always ready and willing to sacrifice his own interest, when he knows full well that the other party would not be benefitted by it, but would take and act upon the advice of some one less scrupulous of his integrity. These facts (and they are facts familiar to every practical architect), will explain to those unacquainted with the practical routine of an architect's business, some of the reasons why complaint is so often made that the real cost of a building so far exceeds the expectation of the owner, or the estimate of his architect. For reasons, in part set forth above, it is too often the case that a dishonest, incompetent pretender, is preferred to the man of integrity and professional ability, and especially is this likely to be the case where those seeking such service are unacquainted with these things.

Such being the case, it will invariably be found best, if you would be well and truly served, to commission your architect at once, and then he can have no motive for withholding any information which he is able to give, and will have none for misleading you, and while no honorable man would intentionally make unreliable estimates for the purpose of misleading, yet self-interest is all-powerful,



MINNESOTA STATE NORMAL SCHOOL, WINONA.---G. P. RANDALL, Architect.

No. 12.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JEFFERSON LIBERAL INSTITUTE, JEFFERSON, WIS. - - - G. P. RANDALL, Architect.

No. 13.

and will, sometimes, influence the actions of an individual against his better judgment.

Again, let me say to those who would have the services of an architect, pay him well and fairly for such service. The published rates of commission by the architects of Chicago, not materially differing with those herein named further on, are only such as will pay a very *moderate* compensation for the time, labor, and responsibility of making a *good* set of plans, and not such as would satisfy the ambition of seven-eighths of the business men of the country.

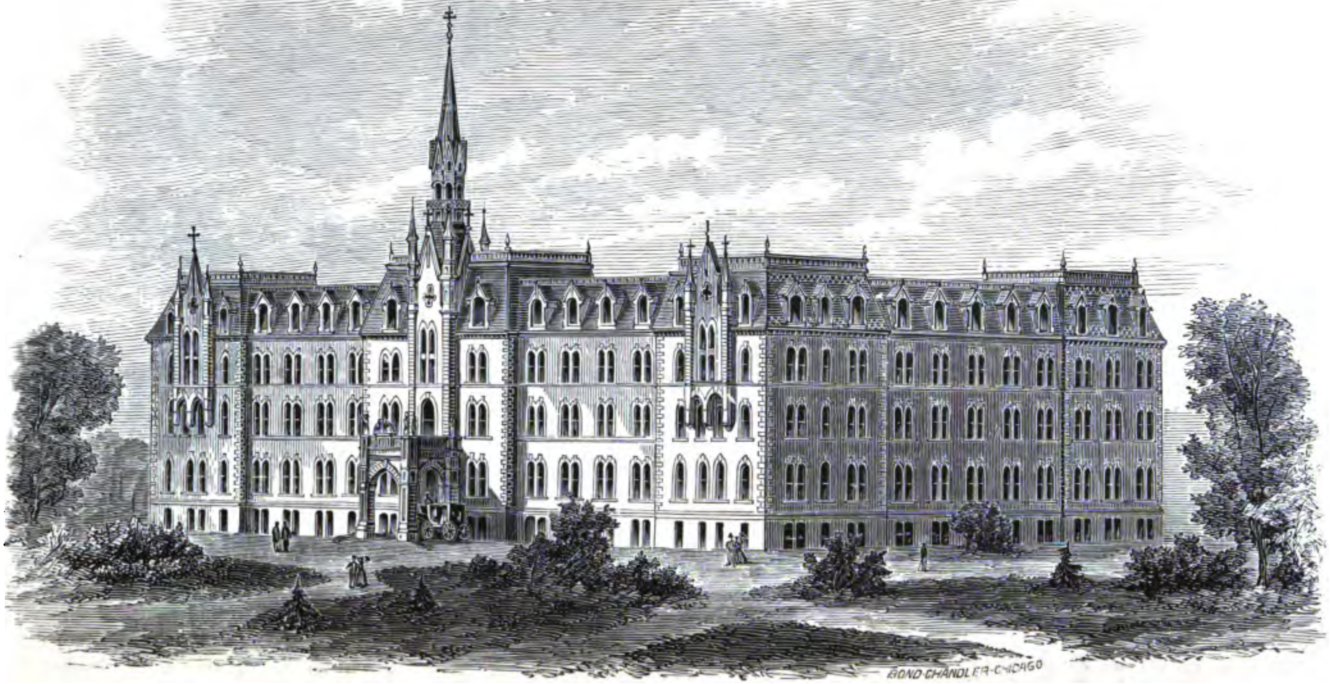
If you would have good drawings and specifications, such as will carry you through with your building without more "extras" at the final settlement than the original contract, you must pay a fair consideration for them, for no man who has sufficient ability to make you a good design, is under the necessity of obtaining work by reducing his compensation, and will not do so unless he does it with the intention of doing your work in accordance with your disposition to pay for it; for every architect knows that a set of drawings for a building that should be worth $1,000, can be made for $500, with nearly equal profit to himself, but not always with equal value to those for whom they were made.

There are a variety of reasons for this, and I will state one by way of illustration. Suppose that in the progress of the work on the plans, and when the designs are well matured, the architect discovers that a different arrangement would materially improve the building, or, perhaps, some material modification would save to his client hundreds or even thousands of dollars in expenses, but he is doing the work at a reduced commission, and to make the necessary changes in the plans would involve an expense to himself of one hundred or five hundred dollars, as the case might be, and completely swallow up all the profit which he is fairly entitled to on his work. Now, what think you, reader, he would do in such a case; would he work for your interest, at his own expense, or would he work for you according to your deserts, or in accordance with your willingness to pay? If paid a proper remuneration for his work, he is in honor bound to render therefor his best services; but if you insist upon only half paying him for such services, you have no right to expect him to sacrifice his own interest for your benefit. A much stronger illustration than this might be stated, but this must suffice.

With the above statements, candidly and fairly, if not judiciously made, of the causes and effect of what is believed to be an evil which might and should be avoided, it only remains for me to say that, in my own practice, I aim first to make such a design for a building as my employer wants, and to this end am willing, if paid for it, to bestow almost any amount of labor that may be necessary to accomplish so important an object; and secondly, to bring the cost as nearly within the desired limit as is practicable, following my instructions to the letter in all that pertains to style and general arrangements; and while I should deem it my duty to give any and all needful information as to the probable cost, I should not regard myself in any respect responsible for the same, when working under instruction as to dimension, style and character of building.

Architects are not supposed to undertake impossibilities, and experience will soon teach any man in the business, that to make for a design what his employer does not want, for the purpose of making it cheap, will soon leave him unemployed, and without commission of any kind.

Briefly, then, let me sum up the whole matter of respon-



ACADEMY OF THE SACRED HEART, ST. LOUIS, MO. - - - G. P. RANDALL, ARCHITECT.

No. 14.

sibility, as to cost of building, and other matters growing out of it, by saying:

First, That when my services have been retained by a definite order for plans, and those plans sketched, or the dimension, style and material of which the building is to be built mainly determined, then my employer has a right to suppose that I can give him something near the probable cost of the building, but, as before stated, an estimate so made must necessarily be based upon the cost of similar buildings previously built, and be subject to all the contingencies of erroneous judgment of builders, etc., as before recited, for the architect does not, or never should, contract for the work.

Secondly, Except by special agreement, my commission will be based on no estimates or approximate estimates made, until the work on plans has advanced at least as far as above stated, so that I may have suitable data, from which to form an opinion as to the probable cost of the building, and if the estimates then made, on which my commission is based, is thought by my employer to be too high, it shall be determined from estimates made by the best reputed builders in Chicago, who are experts in such work.

Thirdly, If the building be immediately put under contract, my commission may be based upon the contract price covering all the work contained in the specifications and plans; but in case this proposition should be accepted, notice must be given to that effect, before receiving the bids, and the genuineness of the bids, and that they cover every thing contained in the specifications and plans, is to be verified by affidavit if required. If this proposition be not accepted, and notice given as above, then the estimated cost of building, for determining my commission, is to be the cost of the building, if built in this city, averaged for the year the plans were made.

With the foregoing statement and explanation, there need not be any ground for misunderstanding, relative to the points in question.

COMMISSIONS.

In reference to charges, I will say, briefly, that the commission usually charged by myself, for plans, specifications, and details complete, is about as follows, to-wit:

For Dwellings, 2½ to 3 per cent., generally 2½ per cent.

For Churches, 2 to 2½ per cent., generally 2½ per cent.

Public School Houses, 1½ to 2 per cent., generally 2 per cent. (never less, except that the building cost $50,000 or more.)

Colleges, Universities, Court Houses, etc., 2 to 2½ per cent.

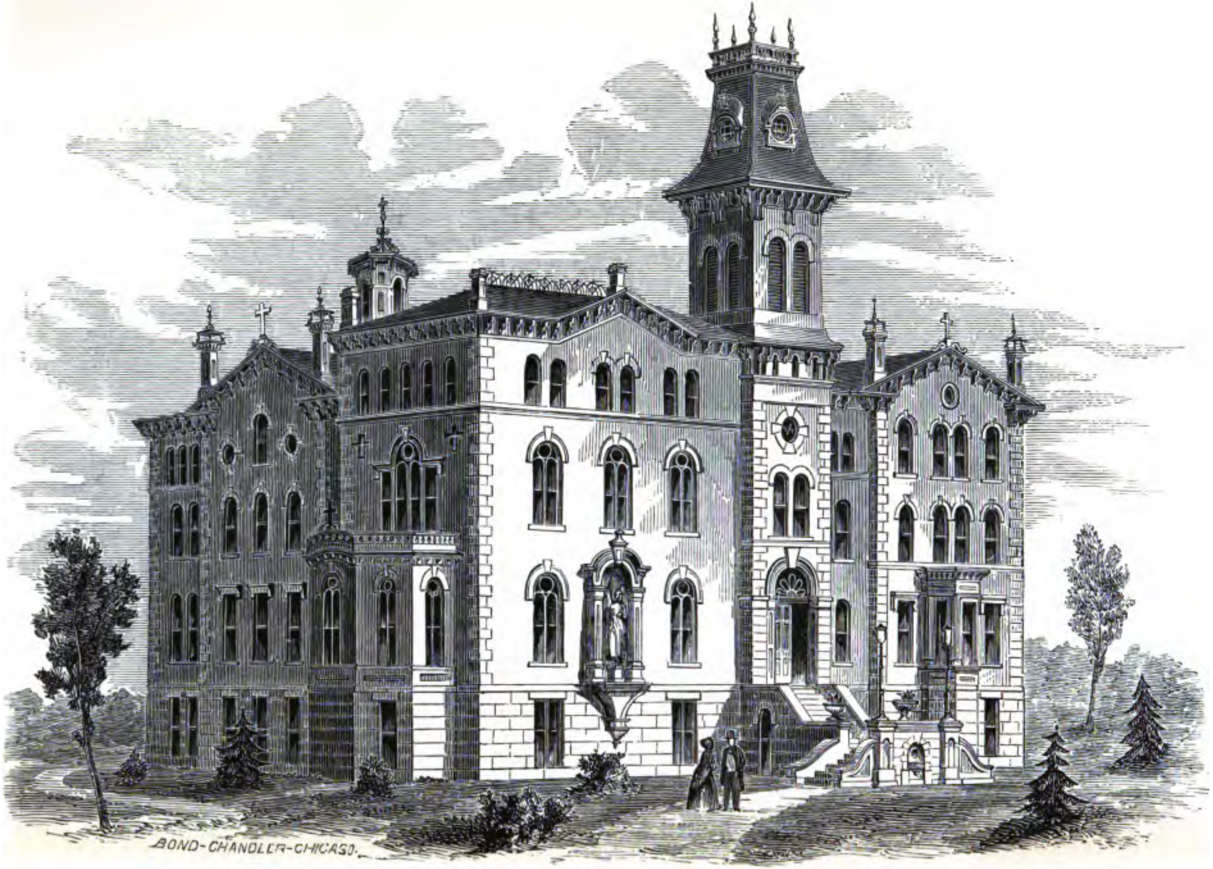
Coarse, plain Warehouses, Machine Shops, and similar buildings, 1½ to 2 per cent.

Single Stores, with offices, 2 to 2½ per cent. If several in a block, a discount will be made.

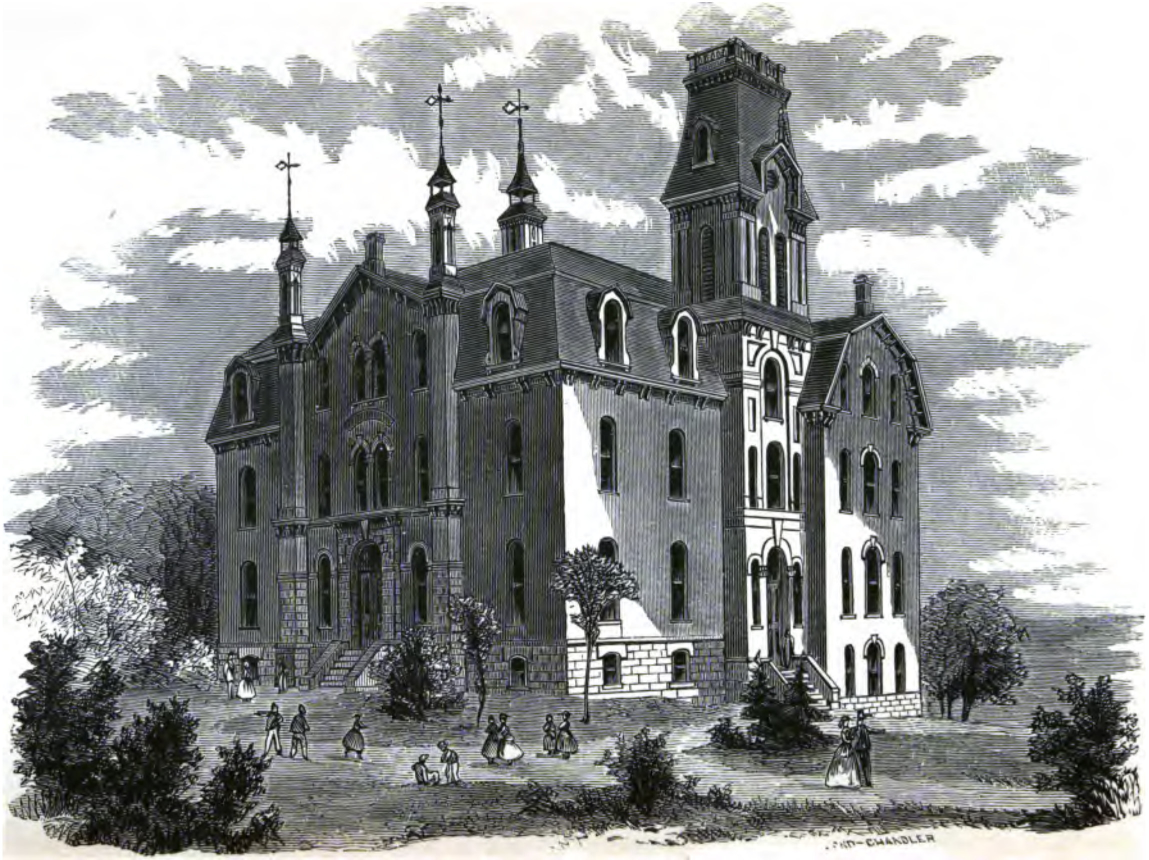
The above commissions are for the plans only, and do not pay for the superintendence of the work. The charge for superintendence is generally about 1½ per cent., or from 1 to 2 per cent. and traveling expenses.

Plans are to be paid for as soon as delivered, or within thirty days, unless a special agreement shall be made to the contrary.

In all cases the drawings are to be used only for the construction of the building for which they were designed, and if permitted to be copied or used by others, for other purposes, the architect is entitled to, and may collect, his commission on all work executed from them.


BOND-CHANDLER-CHICAGO.

ST. MARY'S ACADEMY, LEAVENWORTH, KANSAS. - - - G. P. RANDALL, Architect.



HIGH SCHOOL, KANKAKEE, ILL. . . . G. P. RANDALL, Architect.

DRAWINGS MAY BE SENT FOR INSPECTION.

In my Illustrated Catalogue, I have said that I will send plans for inspection and return, to those who are going to build; and I will add here, that, while I am willing to improve any opportunity to aid individuals or committees in determining what arrangements of interior and style of building generally will best suit them, they should understand that I can not keep plans on hand, of the value of from five to ten thousand dollars, and incur the expense in time and labor necessary to keep them circulating over the country, for the special benefit alone of those who send for them. In other words, I do not care to send them to parties who will use them only to aid themselves and others in designing what they want, and give me no benefit from them; but wherever there is a reasonable probability that my services will be required, such plans will be sent in advance in aid of the desired object—that of obtaining a good design; the cost of transportation both ways, by express or post, to be paid by them, and they must not, on any account, be exhibited to other architects, or persons who make such drawings.

Before deciding on a plan, if you would get the value of your architect's knowledge and services, HAVE A PERSONAL INTERVIEW WITH HIM. If you can not see him at his office, he will go and see you; and though it should be a journey of five hundred miles, more or less, if you have a building of much importance, you can not afford to neglect this all important matter, for though you might select a good design, or one that you would regard as such, from a half dozen or more plans that should be sent you, yet, under such circumstances, it is often the case that on comparing ideas with your architect, you would conclude that a much better design might be made than the one you had selected, and it is very poor policy to build after a design that is evidently susceptible of improvement.

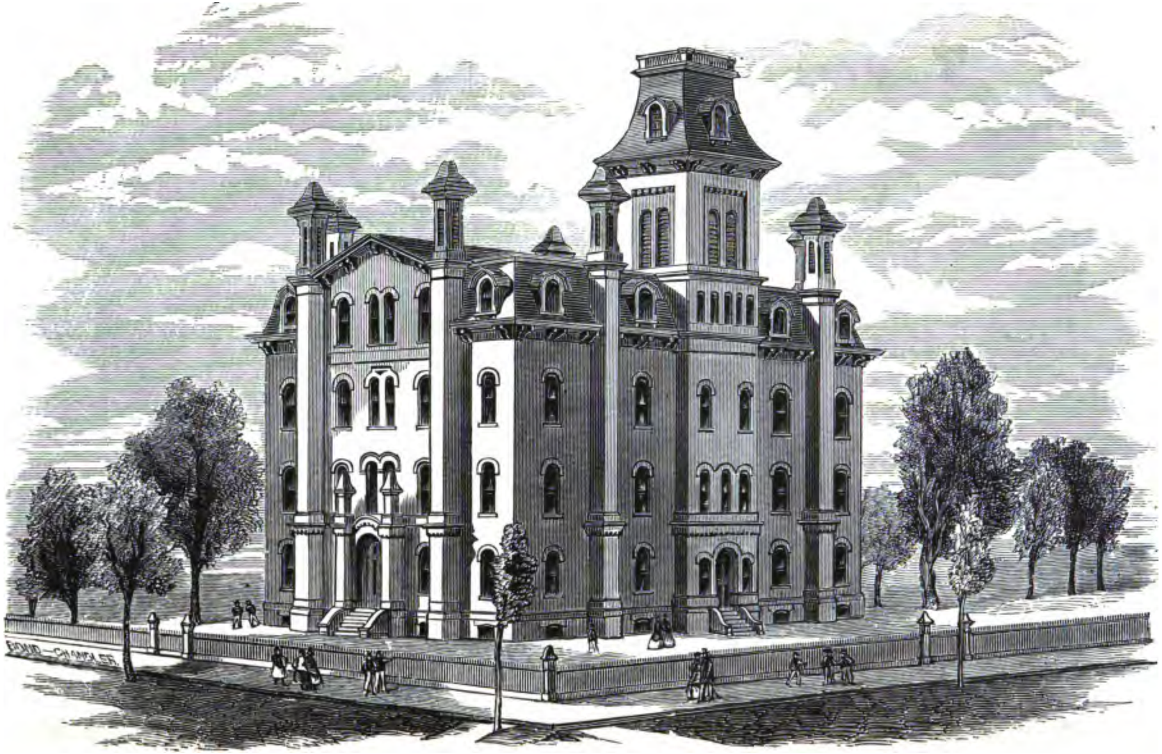
While I should never neglect, but always solicit, orders for plans for any and all kinds of buildings, to be used for legitimate, moral, and lawful purposes, I have made the designing of public buildings such as COURT HOUSES, CHURCHES, SCHOOL HOUSES, COLLEGES, MASONIC LODGES, CONVENTS, ETC., rather a speciality, and have a great variety of designs for these as well as other buildings, in my office for inspection.

CHURCHES.

I have given, in these pages, several designs for churches, numbered from 1 to 10, inclusive. I have heretofore given particular attention to this branch of the business, and shall continue to do so in the future. Some of the buildings for which these designs were made, are built, some are building, and others still are to be built.

No. 1 is for a building to be built of stone, with a basement and principal story. The basement will contain a lecture room, bible and infant class rooms, pastor's study, parlors for sociables, kitchen, furnace and coal rooms, etc. On the main floor is the auditorium, with choir at the front and galleries in each transept on the sides, and is to have an open timber roof inside. It is intended for a corner lot, and is to have a small bell tower at the rear corner, next the side street. The main auditorium will seat about one thousand people on the main floor, and may be increased in capacity indefinitely. The cost of the building would not be less than from one hundred ten to one hundred forty thousand dollars.

No. 2 is a view of Plymouth Congregational Church, Chicago. This building is about 72 by 112 feet, has a



HIGH SCHOOL, AURORA, ILL. - - - G. P. RANDALL, ARCHITECT.

No. 17.

basement containing lecture, infant and bible class rooms, pastor's study, parlors, etc., and is one of the finest church basements in the city. Above is the main auditorium, with spacious vestibules and stairways, and an organ gallery over. The building is substantially built of stone. Its auditorium affords sittings upon the main floor for 1,000 people, and in this respect is the largest Protestant church in the city.

No. 3 is the Eighth Presbyterian Church of Chicago, on the corner of West Washington and Roby streets, W. D. It is of wood, was built by day's work, in a most thorough manner, and at a cost of about $32,000. In the basement is the lecture, bible, and infant class rooms, pastor's study, coal room, etc. On the main floor the auditorium is about fifty-one by seventy-nine feet, and will seat five hundred seventy-five persons. The orchestra is in the rear of the pulpit, and raised some four or five feet above the floor, being directly above the pastor's study, which latter, together with the choir and pulpit, are each reached by a private entrance through the small tower on the side street in the rear. It has an open timber ceiling, finely frescoed, lighted from the roof by gas and Frink's reflectors, and is warmed by furnaces. Its easy stairway, spacious vestibules, and other appurtenances, complete in every particular, make it one of the best houses of the kind in the city or country.

No. 4 is a view of the M. E. Church, Decatur, Ill. It has a basement for the usual purposes of lecture rooms, class rooms, etc.; an auditorium on the main floor, about forty-four by seventy-one feet; will seat some four hundred twenty-five persons, and, when finished complete, built of brick, would cost from $22,000 to $25,000.

No. 5 is a Congregational Church now building at La Crosse, Wisconsin. It has a basement with bible and infant class rooms, pastor's study, etc.; an auditorium on the main floor, fifty-one by eighty feet, a timber ceiling, frescoed; is to be heated with furnaces, and lighted with gas and reflectors in the ceiling. It will be built of brick, and cost some $30,000.

No. 6 is a design made for a church to be built at Iowa City, for the first Congregational Society, but was afterwards modified so as to reduce the cost. This design is for a good brick building, with basement, to cost $40,000.

No. 7 is for a neat and tasteful country or suburban frame church, without a basement. It is arranged for two hundred thirty-four, but may be increased to three hundred or three hundred fifty sittings. It would probably cost some six or seven thousand dollars, and possibly more.

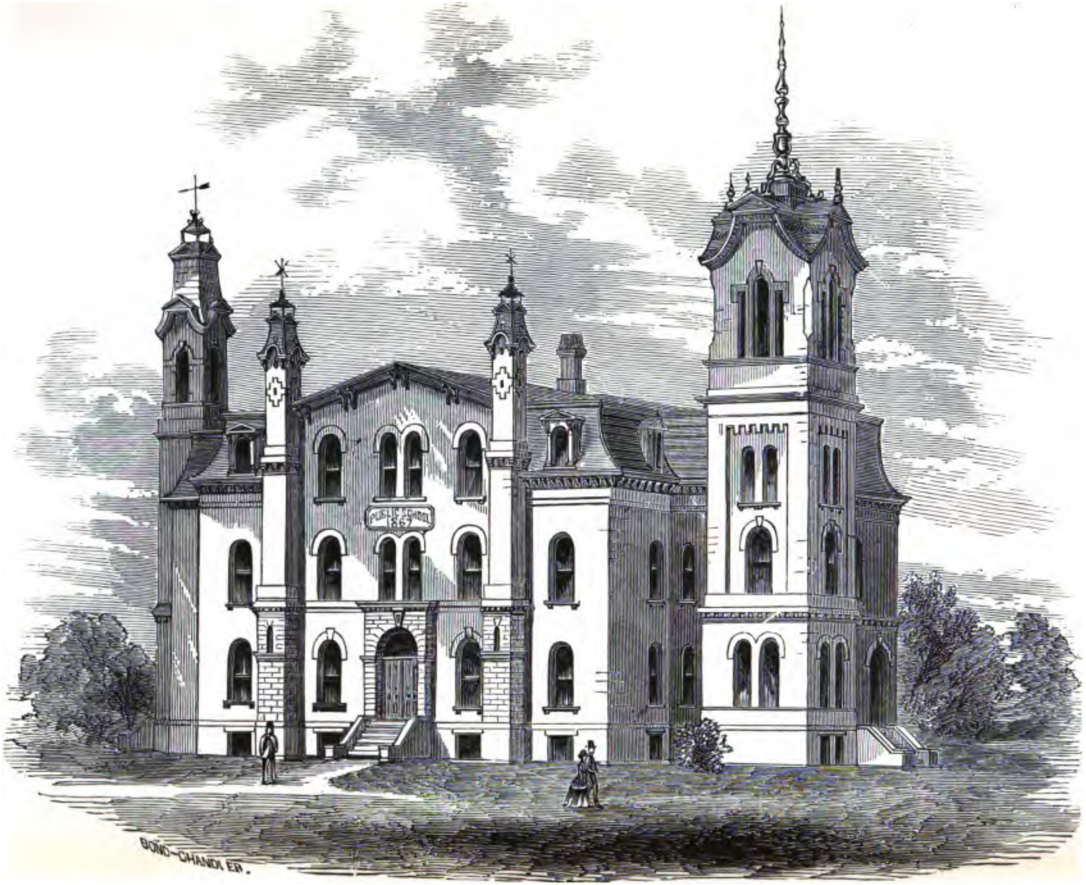
I have a similar design for a brick building, but of larger dimensions, that would cost $12,000 to $14,000.

No. 8 is a neat little country church, built at Oliva, Pa. It was built of wood, will seat two hundred or more, and cost about $5,000.

No. 9 is a design for a building 38 by 76 feet, and without a basement. It seats three hundred fifty-four persons, and would cost about $12,000. It might be reduced in cost by reducing the length and number of sittings. It makes a very neat little church, and is arranged to be built with the most rigid economy.

No. 10 is a neat, tasteful little church, designed some years since for a society in Wisconsin. It was of brick, and could be made to seat from three to five hundred persons. Its cost would, of course, depend mainly upon its dimensions.

I have several churches building in the north-western States, the plans for which, and others, may be seen at my office, or, with those named above, may be photographed and sent out to committees for inspection.



HIGH SCHOOL, MARSHALL, MICH.---G. P RANDALL, ARCHITECT

The principal difficulty in designing neat and tasteful churches, is the want of means to build them. Almost every society is too poor, or the members think themselves too poor, to expend any thing beyond what is absolutely necessary to erect a very plain building. Nor is plainness objectionable in a certain way, and to a certain extent. A building may be neat and tastefully designed, unique in style, and still be plain. Such an one is No. 1, in these pages. Its variety of outline, bold and massive buttresses, turrets, gables, etc., all tend to indicate strength and durability, and at the same time give such a variety of outline that the eye does not weary in looking at it. Nor need these results necessarily depend upon the outlay of large sums of money. A small building, however humble in its capacity, and unpretentious, may possess all the above named qualities, though of course on a less magnificent scale. As a general rule, the old New England meeting-house form, that of an oblong square or parallelogram in plan, is the least expensive form that can be given to such a building, but there are few societies so poor that they can not sacrifice something to beauty.

Of the material of which a church should be built, stone seems the most appropriate, if it can be had within reasonable expense. Brick is a good material as regards durability and economy, but except for the last named quality, it could never compete with stone. Wood answers a very good purpose for buildings of moderate expense, and a good church building may be built of this material. It also has the advantage of producing a very excellent effect by the use of colors in painting. In this respect it is sometimes preferable to brick, even in houses of considerable cost. A house can usually be built from fifteen to twenty per cent. cheaper of wood than of brick, and under ordinary circumstances a building of stone is considerably more expensive than if built of brick.

EDUCATIONAL BUILDINGS, UNIVERSITIES, COLLEGES, ACADEMIES, ETC.

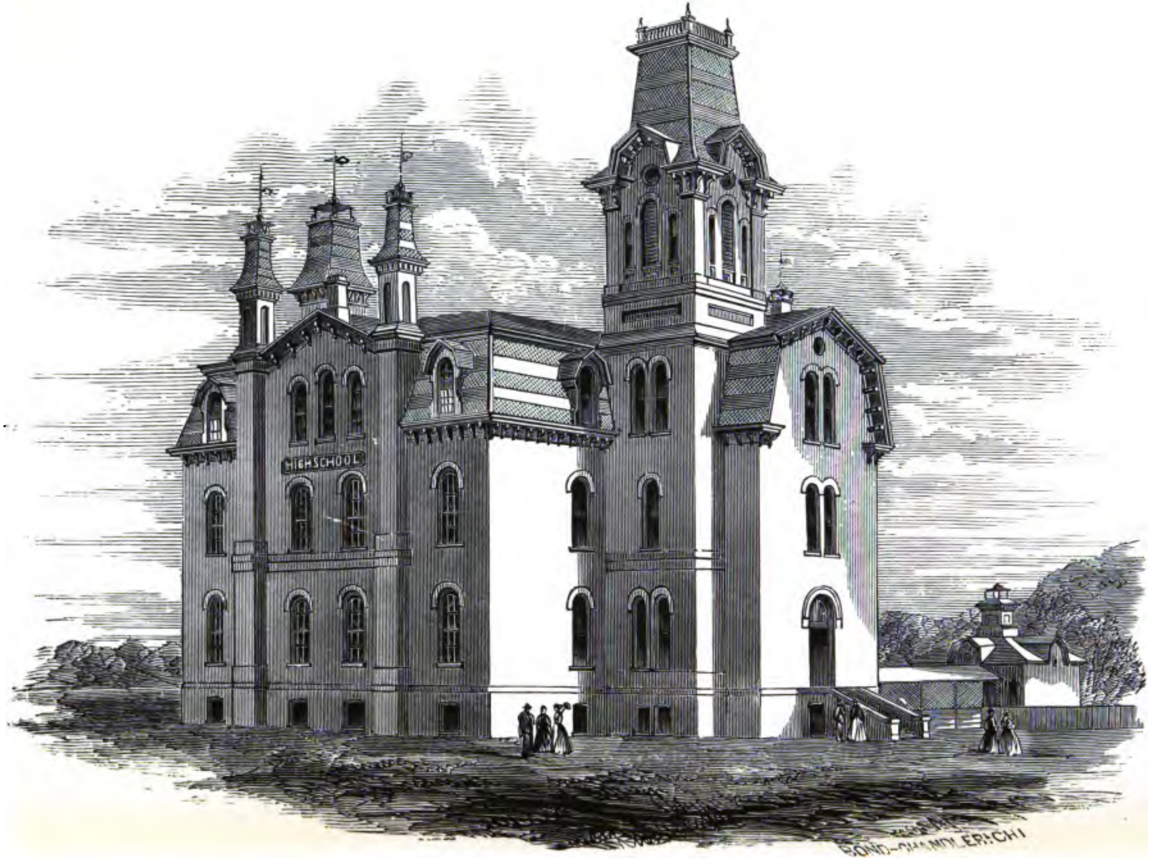
Of buildings for educational purposes, a very liberal portion of the patronage of the directors of such institutions has fallen to my share. Of the higher grade of these schools, there are at present in process of construction from my designs, the

NORTH-WESTERN UNIVERSITY.

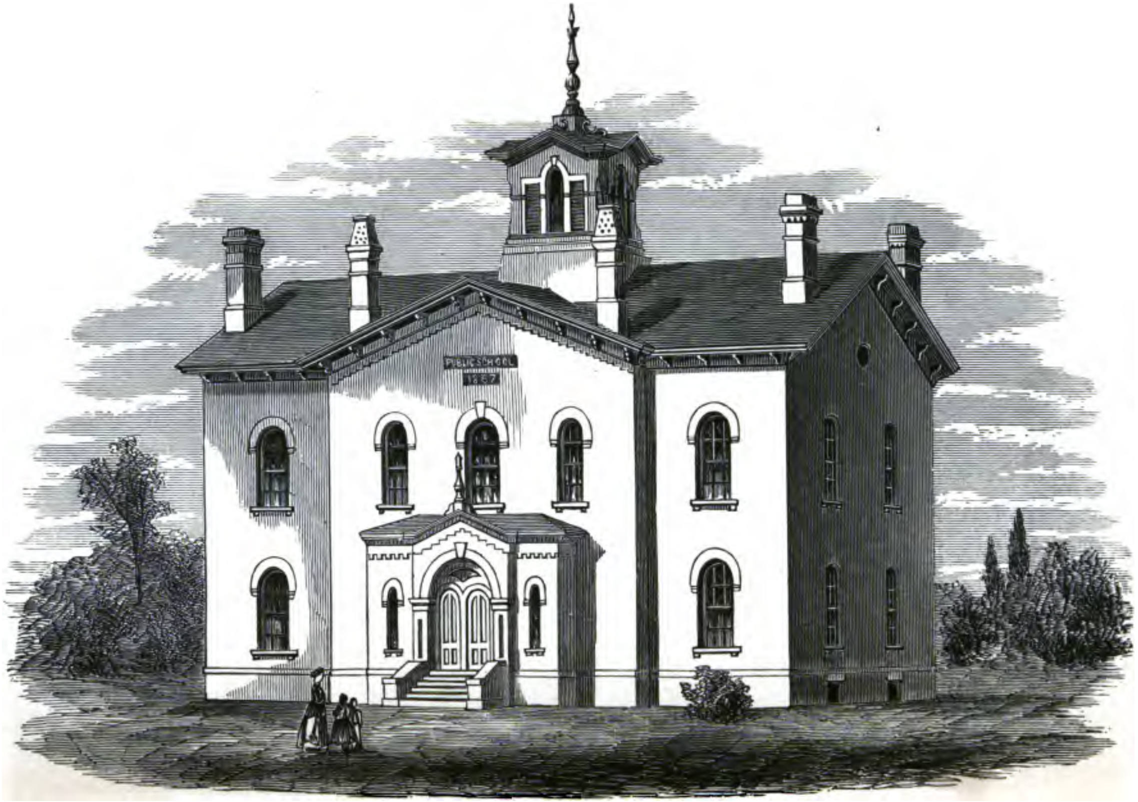
at Evanston, Ill., under the guardianship of the Methodist Episcopal Church of the North-west, a view of which may be seen in plate No. 11. It is being built of stone, in the most substantial manner; and, situated as it is, in a beautiful grove on the shore of Lake Michigan, it will take rank with the best buildings of the kind in the country. Its cost will be something over $100,000.

MINNESOTA STATE NORMAL SCHOOL.

This building, (view No. 12) is in process of construction at Winona, Minn., and when completed will be one of the best buildings of the kind, or for a similar purpose, in the United States. It will be about seventy by one hundred and sixty feet on the ground; irregular in its outline, as may be seen by the view, and is to be as complete in all its interior arrangements as it is practicable to make such a building within a limited expense. The designs were made under the immediate supervision of one of the leading practical educators of the country, Prof. Wm. F. Phelps, Principal of the



HIGH SCHOOL, WINONA, MINN. - - - G. P. RANDALL, ARCHITECT.



WARD SCHOOL, MADISON, WIS. - - - G. P. RANDALL, ARCHITECT.

No. 20.

school, and no pains will be spared to make it a model building. It will probably cost from $100,000 to $125,000.

JEFFERSON LIBERAL INSTITUTE.

This building, (No. 13) is now being built at Jefferson, Wis., under the auspices of the Universalist denomination. The character of the school is to be that of an academy, and the building will cost in the vicinity of $50,000. It is finely situated for a first class school.

During the past year I have designed several buildings for conventual purposes, and have given views of two of them in these pages; one,

THE ACADEMY OF THE SACRED HEART.

is now in process of erection at St. Louis, Mo., under the immediate superintendence of T. Menard, Esq., builder, of this city, and is to be one of the most substantial structures of its kind in the country. It has a frontage of two hundred and fifty feet, with wings extending back on each flank, and a large chapel in rear of centre between the wings. It is to be faced with Milwaukee brick and stone dressings, and is estimated to cost, when completed, about $400,000. A view of this building is given in No. 14. Its ample dimensions, its chapel in the rear, (not seen in the view) its fine carriage porch in front, entirely of stone; its spacious corridors, large kitchen and other rooms for culinary purposes, its superior arrangement for heating and ventilation, together with the substantial character of the building generally, tend to place it in the front rank among buildings for a similar purpose in this country.

ST. MARY'S ACADEMY.

This building, like the preceding one, is also to be used for conventual purposes, and though less imposing in its general dimensions, will, nevertheless, in an architectural point of view, bear comparison with almost any building of its kind in the North-west. It is to be built on a beautiful site just outside the city of Leavenworth, Kansas, and when completed will probably cost from $75,000 to $100,000. A view of this building is given on plate No. 15.

Besides those named above, I have heretofore designed the State Normal University, at Normal, in this State; several normal school buildings in Wisconsin, colleges, seminaries, etc.

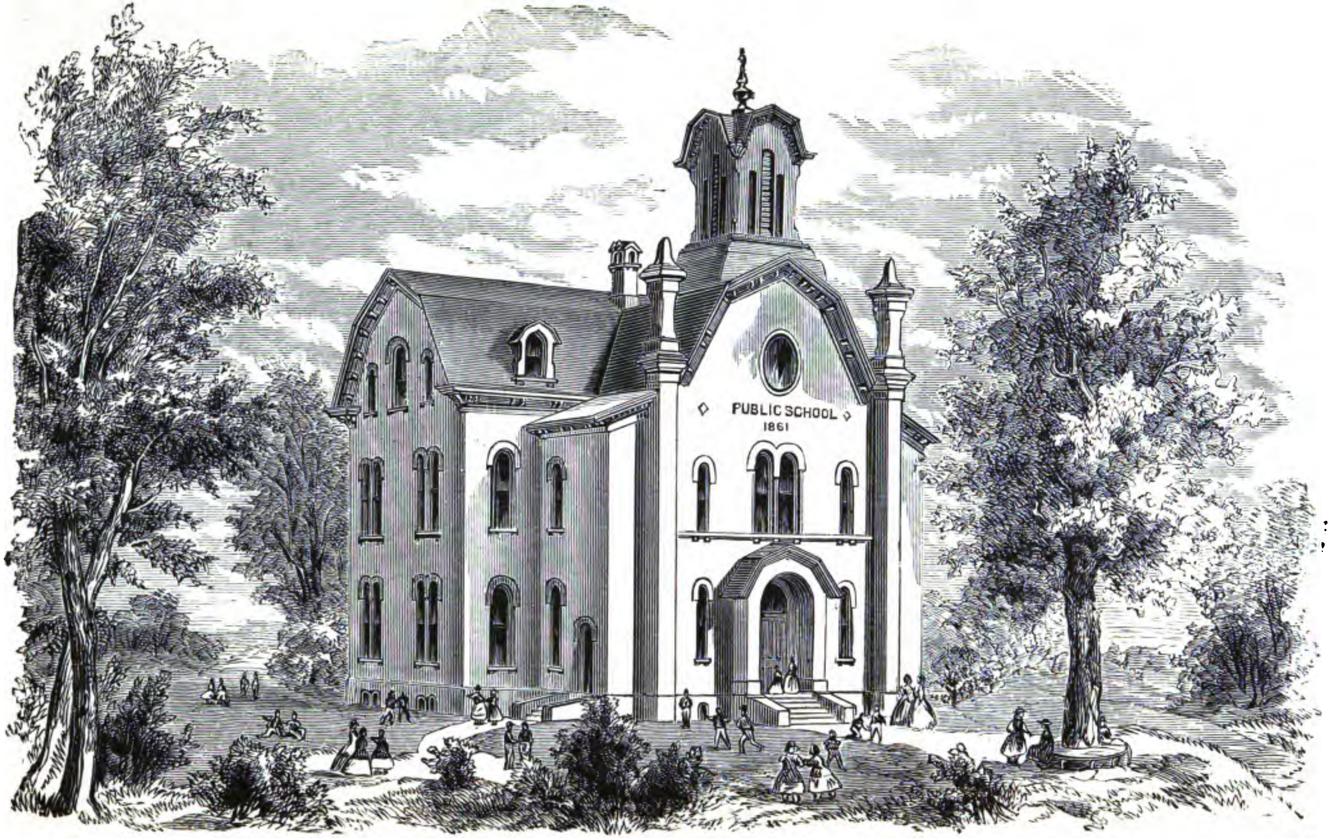
BUILDINGS FOR PUBLIC SCHOOLS.

Of this class of buildings I have designed a great number. Those given in these pages are the buildings for a high school at Kankakee, Ill., (No. 16). One at Aurora, (No. 17). Marshall, Mich., (No. 18), and Winona, Minn., (No. 19). No. 20, is a ward school at Madison, Wis.; No. 21, at DeKalb, Ill.; No. 22, a ward school at Sycamore, Ill.; and No. 23, the high school building, at Berlin, Wis. Two of the largest, and when built, the best public school buildings I have designed the past year, are for the School Boards at Clinton and Danville, respectively, in this State. They will each contain eighteen school rooms, besides a large hall, teachers' retiring rooms, wardrobes, recitation rooms, library, etc.

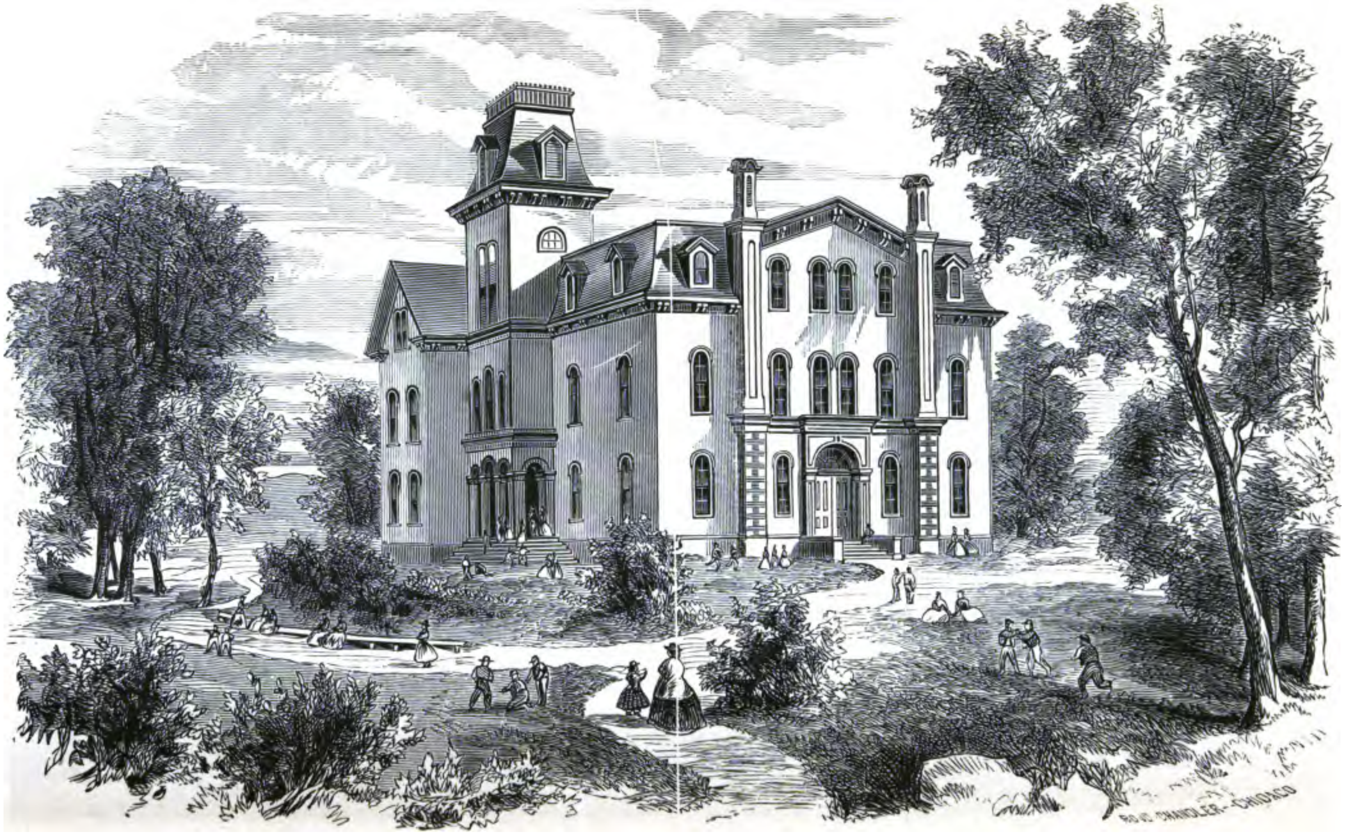
The following will indicate the location and cost, or probable cost, of some of the best buildings of this character which I have designed within the past year.

LIST OF SCHOOLS.

	COST.
High School, Marshall, Mich.	$40,000
High School, Danville, Ill.	60,000
Ward School, Clinton, Ill	60,000



WARD SCHOOL, DeKALB, ILL., - - - G. P. RANDALL, Architect.



WARD SCHOOL, SYCAMORE, ILL., - - - G. P. RANDALL, Architect.

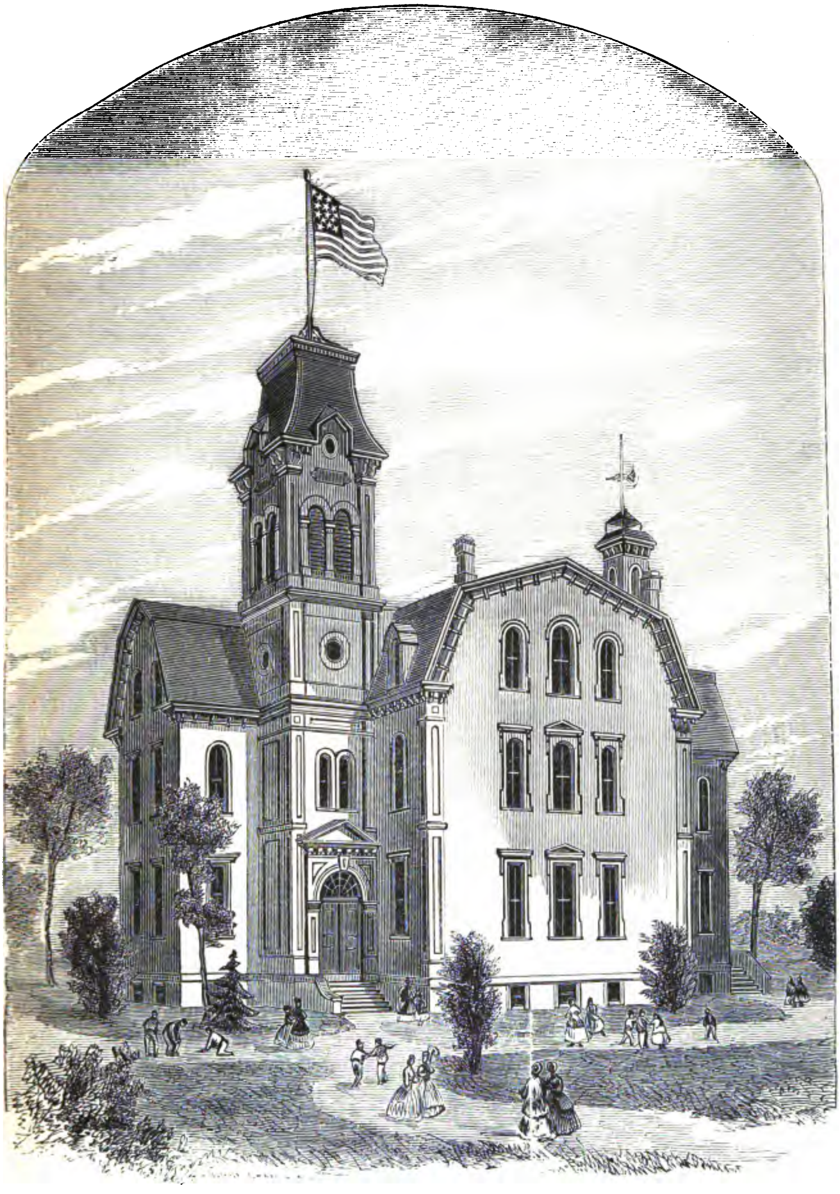
No. 22.

Ward School, Abingdon, Ill	23,000
High School, Atchison, Kansas	28,000
Ward School, Hastings, Minn	23,000
Ward School, Wabasha, Minn	22,000
Ward School, Madison, Wis	16,000
Ward School, Madison, Wis	13,000
Ward School, Collinsville, Ill	30,000
Ward School, Elkhorn, Wis	11,000
Ward School, Chenoa, Ill	17,000
Ward School, Pana, Ill	17,000
High School, Kankakee, Ill	42,000
High School, Winona, Minn	42,000
High School, Berlin, Wis	20,000
Ward School, Independence, Iowa	18,000
High School, Litchfield, Ill	26,000
High School, Olney, Ill	26,000
Ward School, Jacksonville, Ill	35,000
Ward School, Charles City, Iowa	14,000
Ward School, DuQuoin, Ill	20,000
High School, Galesburg, Ill	40,000
High School, Macomb, Ill	25,000
High School, Red Wing, Minn	25,000
High School, Aurora, Ill	65,000
Ward School, Pekin, Ill	25,000
Ward School, Sycamore, Ill	20,000
High School, Laporte, Ind	50,000
Ward School (Haven), Chicago, Ill	50,000
Ward School (Skinner), Chicago, Ill	60,000
Ward School (Newberry), Chicago, Ill	60,000

The cost of each, as given, is their probable cost at the present time.

The above list comprises *only a very small portion* of the whole number I have designed within the last few years; and to School Boards and Directors permit me to say, that I can send them plans for inspection and return, of almost any kind of a house, from the capacity of one school room of forty or fifty sittings, to that of twenty or more rooms, and sittings for fifteen hundred pupils. A good house for a country ward school, is one with two school rooms on each floor, and two stories high. Such a house, built of brick, will generally cost about $12,000; sometimes more and sometimes less, according to circumstances. If a larger school house is wanted, add another story, and it will cost about $17,000; or, add a wing in the rear for two rooms, and the cost will be about the same. Each room may seat from sixty to sixty-five pupils, though a less number would be better. A good arrangement for a smaller house, is to make it two stories high, with one school room on each floor. For a larger house, they can be arranged with three rooms on a floor, and make them three stories high. Such an one will cost from $23,000 to $28,000. One of still greater capacity would have four rooms on a floor, and have three stories in height. Such a house, built of brick, would cost from $25,000 to $40,000. I have designed several that have been built for less, and some that have cost more than these figures. The largest houses for public schools that I have designed, are the Skinner and Newberry, of Chicago; and one at Clinton, and another at Danville, Ill. The last two have a centre building, three stories high, with four rooms on a floor; and a wing on each flank, two stories high, with two rooms on a floor. This gives eighteen school rooms and a hall, with all necessary wardrobes, teachers' closets, retiring rooms, etc.

In the foregoing I have attempted to give some data by which School Directors may be guided in determining the probable cost of their contemplated building, in advance of



WARD SCHOOL, BERLIN, WIS. - - - G. P. RANDALL, ARCHITECT.

No. 23.

ordering plans. When the plans have been determined upon, a more definite conclusion may be arrived at in regard to the cost.

In the designing of a good school house there are certain elements which should enter into the composition, and without which it would be entirely imperfect; as, for instance, every school room should have a well devised arrangement for heating and ventilating. [For a more full consideration of this subject, see article on heating and ventilating, elsewhere given.] These arrangements may be made more or less perfect, according to the amount of money that can be appropriated for such purposes; or, in other words, to the appreciation School Directors have of pure air and good health for their children, over impure air for the children, and doctors' bills for themselves and those they represent. It is entirely practicable to ventilate a school room well, though through the penuriousness of many School Directors and their constituents, but very few reach this standard.

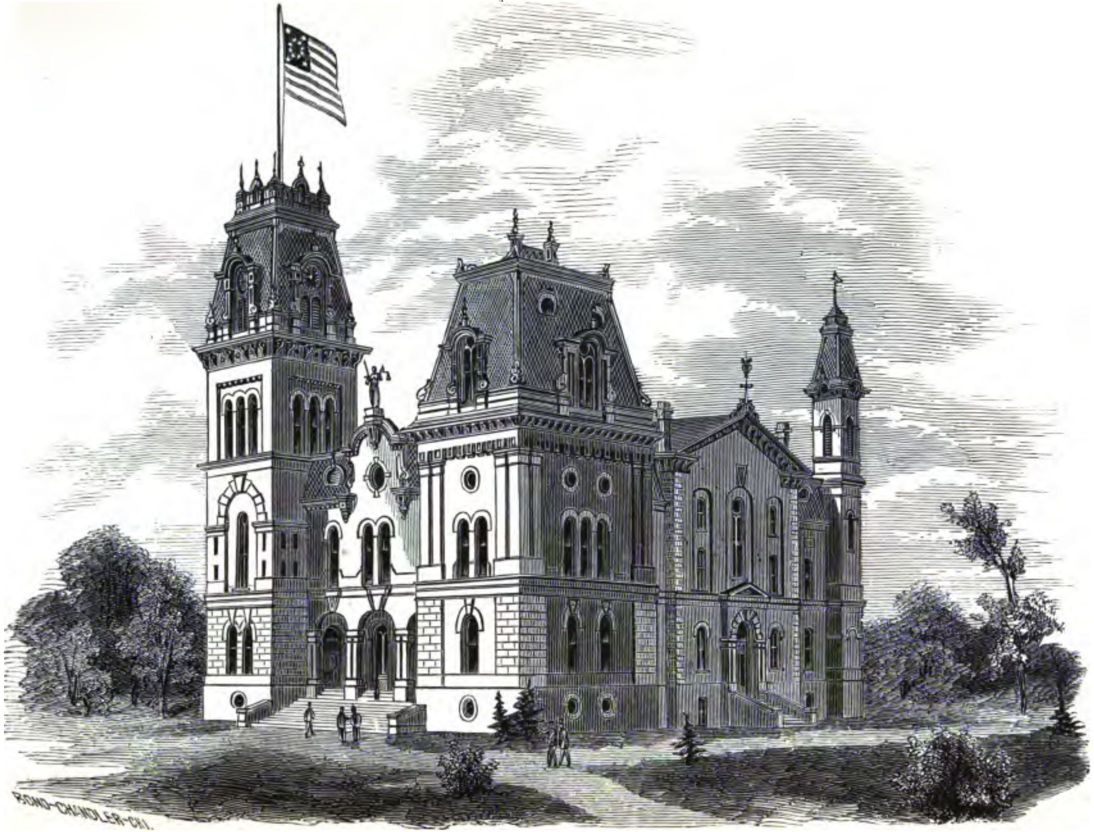
Externally, a school house may be ornamented to suit the tastes of the people. Internally, there is no occasion for much ornamentation, beyond that of simple neatness, and this can be obtained without other expense than that of moderately moulded architraves for doors and windows, with walls wainscoted all around below the black-boards; inside blinds to the windows, and the whole grained in imitation of oak, ash, or other light woods.

But it is the arrangement and perfection of these and numerous other details, that goes to make up a model school house; and while it is not necessary that money should be spent in useless ornamentation, there are certain things that are absolutely and indispensably necessary in a modern school building, and no community in which there are children to be educated, is so poor that it can not afford a decent school house.

COURT HOUSES.

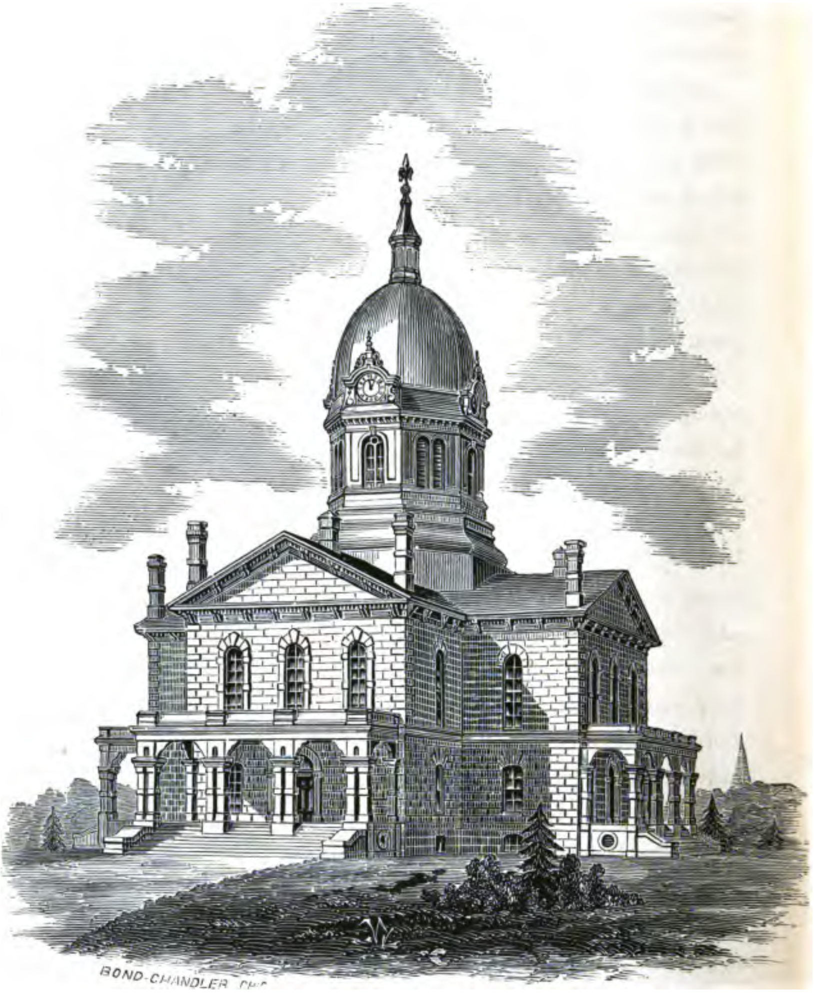
To this important branch of the business I give especial attention, and have designed several during the past season, which are already in process of construction. One of them, No. 24, is building at Jacksonville, the county seat of Morgan County, Ill. It is, as the view indicates, irregular in its outline, and is about one hundred and thirty feet long, by seventy feet wide. It is to be built of brick, but faced with stone outside, and will be a thoroughly substantial building. The principal offices in the lower story, or those wherein records are to be kept, are to be fire-proof, being built with fire-proof floors and ceilings, and iron shutters to doors and windows. This method for preserving records is much superior to fire proof vaults, especially in large counties. The arrangement of the court room and its appendages, is as complete as could be desired. It is also well lighted and ventilated. Besides the court room, there are rooms for supervisors, grand and petit jurors, judge's retiring room, law library, etc. Its cost, when completed, will be about $160,000.

Design No. 25 is building at Winterset, the county seat of Madison County, Iowa. This building is regular in its outline, and in the form of a Greek cross, each arm of the cross presenting a front — one to each of the four sides of the square on which it stands, and each front exactly alike. Its dimensions from end to end of the opposite arms of the cross, are one hundred feet; and the width of each arm fifty feet. These dimensions do not include the piazzas. The building is to be built of an excellent quality of magnesian limestone, from quarries about two miles distant. The outside face is to be of dressed stone. The piazzas also are to be of stone. The dome is to be of wood, and covered with metal. Internally there are to be fire proof vaults connected with the


BOND-CHANDLER-CHI.

MORGAN COUNTY COURT HOUSE, JACKSONVILLE, ILL., - - - G. P. RANDALL, ARCHITECT.

No. 24.



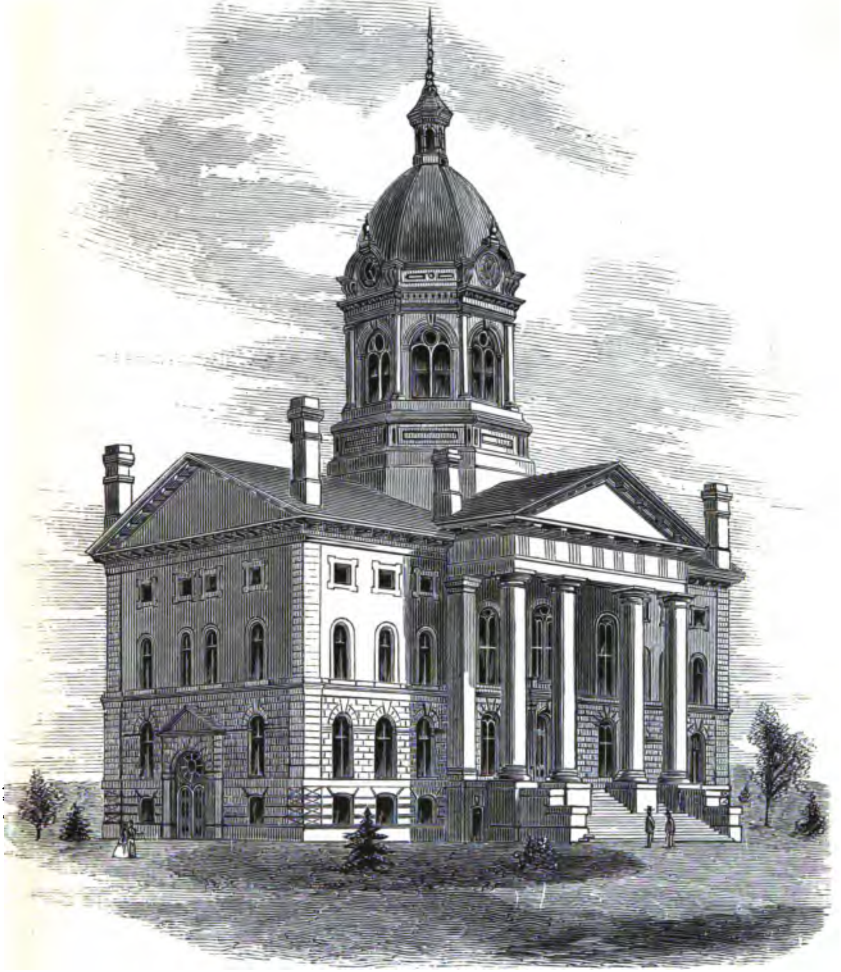
MADISON COUNTY COURT HOUSE, WINTERSET, IOWA.

G. P. RANDALL, Architect.

No. 25.

offices, wherein records are to be kept; but otherwise the building is not to be fire proof. A novel feature in this building is that it has a jail in the third story. It is a room about twenty-three by forty-six feet, entirely lined inside the stone walls with boiler plate iron, with floor and ceiling of the same material. Inside this room there are to be eight iron cells, with all the modern improvements, and room for a still greater number, if necessary. This arrangement of the cells is regarded as a very fine feature, as it places the prisoners entirely above and out of the reach of outsiders, and at an elevation that precludes dampness, gives them plenty of good air and ventilation, and makes them much more secure than they could be in the basement or lower rooms of the building; and, besides this, the place occupied by the jail would be of little value for any other purpose. The building is to be finished complete for $75,000.

Design No. 26 was made for Morgan County, Ill., to be built upon the "Court House Square," but it was afterwards thought best to change the site to a more retired location, and "inside" lot; therefore this design was abandoned for one previously given (No. 24). This building was designed to present a portico on two opposite sides, one of which is shown in the accompanying view. These porticos were to have had stone pillars some five feet in diameter, with massive stone entablatures, cornices, etc.; in short, the entire exterior was to have been stone. The design was originally made with a basement somewhat higher than here shown, so as to make therein a story for offices; but as this arrangement would not generally be wanted, it has been cut down to such a height as would make a good cellar for fuel, furnaces or other heating apparatus. Under some circumstances it might be advisable to cut it down still more. It will be seen by the view that it has an entrance at each end, through the basement; these connect with stairways leading to the main floor. These end entrances, if desired, might be dispensed with. It would make a spacious and well arranged house inside, having fire proof offices on the main floor, and a good court room above, with all needful appendages, such as grand and petit jurors' rooms, supervisors' rooms, committee rooms, etc. The cost of this building, complete, would be from $140,000 to $160.000, according as it might be more or less convenient to obtain the material and labor for the construction of the same. This design is for a building about one hundred and eighteen by sixty-two feet, exclusive of the porticos. Built of stone, with its massive Doric porticos, and its lofty dome, it would present an imposing appearance. It could be modified somewhat, and built of cheaper material, so as to reduce the cost very materially; but it might be better, rather than do this, to adopt a different design. Such an one may be found in No. 27, which is for a building to stand upon an inside or corner lot, but not an open square. It is to be about sixty by ninety feet, exclusive of the porticos. Internally it has all the rooms necessary for county purposes, and with a slight modification, there might be a jail in the third story at the rear. The basement, or first story, should be built of stone, but the balance might be brick. It would probably cost from $60,000 to $75,000, though this is but an approximate estimate. The first two designs, Nos. 24 and 25, have both been put under contract for several thousand dollars less than the architects' estimates, and if properly superintended, will be built with few or no extras; and I will here repeat what has been said in substance elsewhere, THAT IF YOU WOULD AVOID PAYING ONE FOURTH OF THE COST OF THE BUILDING, MORE OR LESS, IN EXTRA WORK, YOU MUST OBTAIN CAREFULLY PREPARED PLANS AND SPECIFICATIONS; and such plans and specifications you can only



COURT HOUSE. - - - G. P. RANDALL, ARCHITECT.

No. 26.

obtain from those who charge full commission for their work. instead of compromising with you for one half of it, and then trust Providence, or good luck, to get the balance out of tradesmen and contractors of easy virtue, whose consciences are not of a reproving kind.

DWELLINGS.

I have given but two designs for dwellings, one (No. 28) the residence of the Rev. F. N. Ewing, of Decatur, Ill.; and the other (No. 29) a proposed residence of Dr. Kennicott, of this city. They are both designed for surburban locations, and in style and outline are somewhat unique in their composition. They indicate only two of the thousand and one forms and pleasing outlines that may be given such structures. To those desiring to avail themselves of my services in making such designs, I would say, that they will have the most careful attention, all the "modern improvements" having their due consideration.

BUSINESS BLOCKS.

I have given but one design for a business block (No. 30), and that is for a building to be built (if built at all) at the south west corner of W. Randolph and Halsted Streets, in this city, by the West Chicago Masonic Relief Association. It is intended to be built with stores in the first story, offices in the second, and rooms for Masonic purposes above. It will have rooms for a Blue Lodge, about forty by sixty feet; and another for Chapter and Commandery, about thirty-two by fifty-four feet, with all necessary ante-rooms, committee rooms, armory, banqueting hall, etc. The plan here shown has not been formally adopted, and may be somewhat modified before built. It is to be owned and controlled exclusively by the Masonic Fraternity.

HEATING

AND

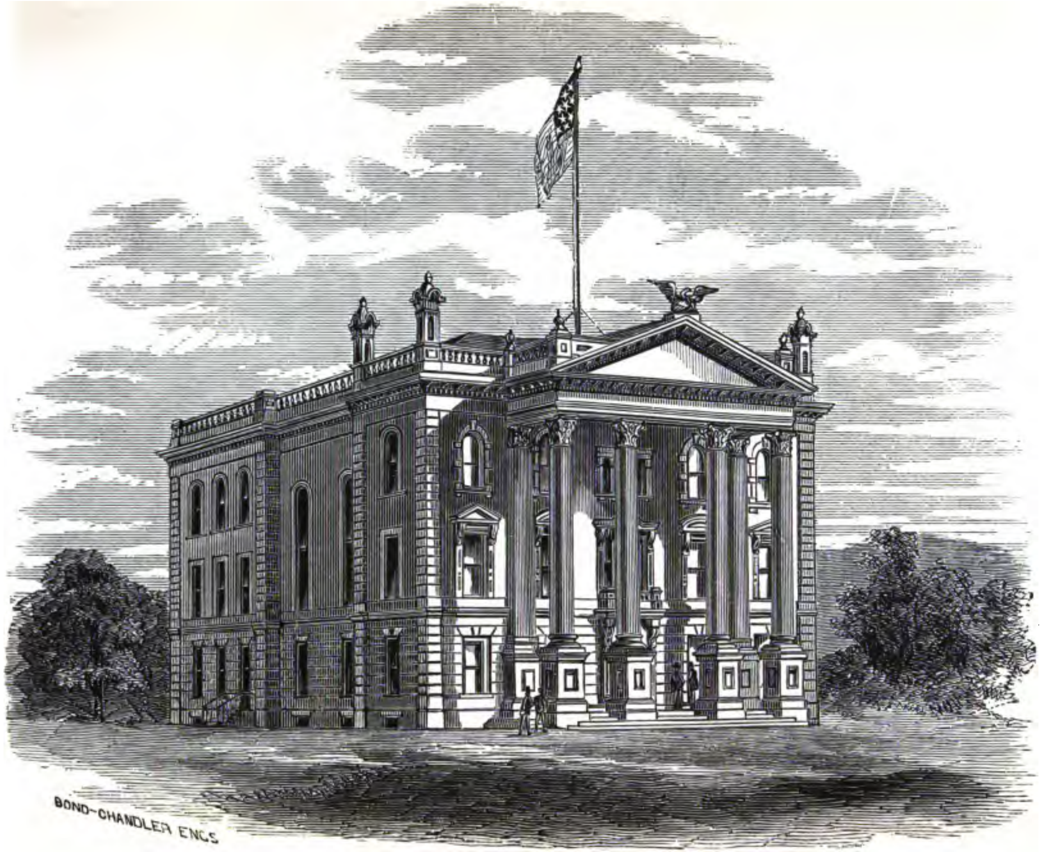
VENTILATION OF BUILDINGS.

THE subject of heating and ventilating our buildings, is one of the utmost importance, and, not unlike many others of vital interest to our health and comfort, is not generally well understood. It is not my purpose to write an elaborate treatise on this subject, but rather to offer some practical suggestions as to the best means to be used, and the most practical method of employing such means, to meet the various requirements under which such system, or systems, may be brought into use.

HEATING.

In considering this subject, the various methods which will claim our attention, are those which come under the general head of "Modern Improvements;" for instance, by hot water or steam pipes and direct radiation; or by either of these methods, the pipes being coiled in chambers in the basement or cellar, and the air passed through the coils to the several rooms, receiving the caloric thrown off from the pipes, before it passes to the rooms. These methods of conveying heat through steam or water, in pipes, are those in general use, though it can hardly be said of heating by water, that it is in general use, as it is but seldom used, probably on account of its greater expense.

Another and more direct method, is through the agency of



COURT HOUSE. - - - G. P. RANDALL, ARCHITECT.

No. 27.

hot air furnaces, of which there is a multiplicity of kinds, each having more or less merit peculiar to itself.

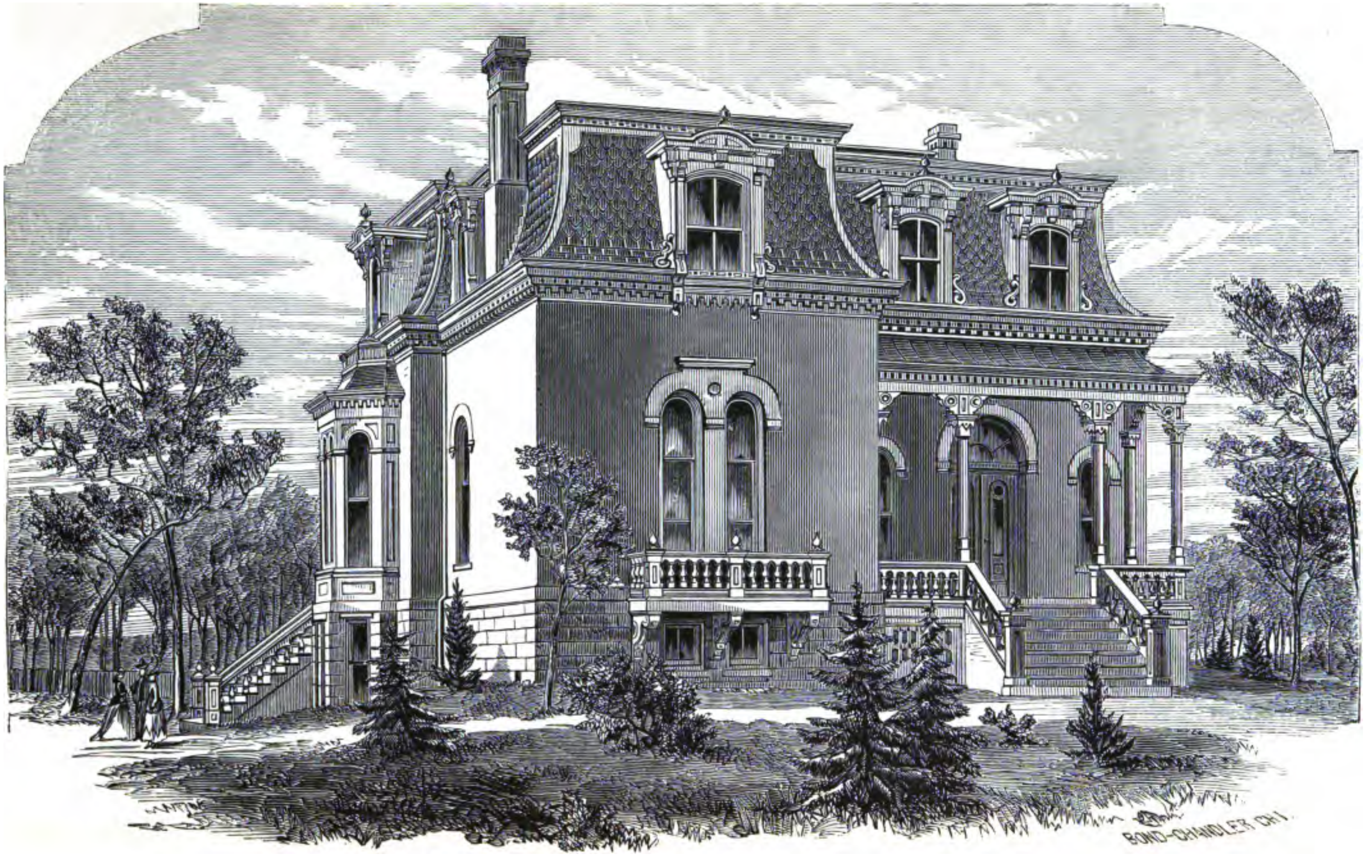
The circumstances for warming most conducive to both comfort and health, are, when the building itself is most thoroughly tight, warm, and dry, without the aid of artificial heat; and no more heat should be used than is necessary for the comfortable occupancy of the rooms.

For the heating of public buildings, there is probably no better method than by the use of steam boilers and pipes, the latter, more particularly the main distributing pipes, to be so large that the steam may be distributed under a *low pressure*, thereby largely diminishing the danger of explosion of boilers, a risk much to be dreaded when the boilers are worked under a pressure of steam of one hundred pounds, or upwards. When properly arranged, under the low pressure system, and carrying no more than from five to ten pounds of steam, with the modern appliances for regulating it, there will be little likelihood of a casualty by the bursting of a boiler.

In the use of steam for heating, it is no doubt most economically applied by direct radiation from coils of pipes, or pipes running around the walls in the room; but as this simply heats the air in the room, over and over, without changing it at all, it can not be otherwise than seriously objectionable on the score of health. It may be said that pure, fresh, cold air, can be introduced into the room (the foul air being exhausted), but there are serious objections to this, as will hereafter be shown, when the subject of *ventilation* is considered. Therefore, in reference to heating by steam, I would say, use coils in chambers, in the basement, or elsewhere, passing pure air over the coils into the room, always providing for an abundant supply, moderately warmed. There are many places where a combination of both methods works advantageously. This is particularly the case in school rooms, and sometimes in public halls. If water be used instead of steam, it would be subject to the same rules of application.

We will now consider the use of hot air furnaces, as a medium of imparting heat; and as I have before suggested, they have taken a variety of forms, all of them having more or less merit, and if properly set and used, will be found quite as economical a method of heating, especially when several rooms are to be warmed, as either by stoves or steam. It is often objected that in heating by furnaces, the air is rendered unfit for respiration by having been in contact with overheated iron; but this is owing to mismanagement of the furnace. To insure satisfactory results, both as to quality of heat and economy of fuel, the capacity of the furnace should be so large that it will supply an abundance of heat without forcing the fire beyond a moderately bright glow; and, there should always be a waterpot within the air chamber, the steam and moisture from which will prevent that unpleasant dryness of the atmosphere, which is so often the cause of complaint, under other circumstances. I have for several years warmed my own dwelling house and office by furnaces, and with satisfactory results; but so much depends upon their proper management, as well as the manner in which they are set up, that however good the furnaces may be, they will prove a failure in some cases, while in others they will give entire satisfaction.

In setting a furnace, and in the arrangement of the pipes, registers, cold air boxes, and other fixtures, a thorough knowledge of the principles on which its working depends, and attention to the details connected with it, together with proper managment in its use, will alone insure satisfactory results.



RESIDENCE OF REV. F. N. EWING, DECATUR, ILL., - - - G. P. RANDALL, ARCHITECT.

The neglect of so small a matter as a damper in a smoke-pipe, is sometimes sufficient to nearly or quite destroy its proper working; and the furnace may be condemned from this apparently trifling neglect.

In the use of any kind of hot air heating apparatus, when the fresh air supply is taken from only one side of the building, and that an exposed side, it will be noticed that when the wind is blowing against the opposite side from the fresh air inlet, there is much difficulty in keeping the rooms warm. This arises from the fact that the wind passing the building with such great rapidity tends to produce a sort of vacuum, or suction, that prevents the fresh air from passing in to the furnace as fast as it should, and hence the rooms to be warmed are deprived of their requisite quantity of heat, and beside this the wind is beating in around every crack and crevice in the windows and doors, and forcing itself against the hot air current from the furnace or heating chamber, already enfeebled by the causes above mentioned.

I have several times seen the wind working so powerfully in the manner just described as to force and suck the hot air from the furnace and rooms, through the cold air box, out into the open air.

This is a difficulty easily cured; and yet it is an every day occurrence to see furnaces condemned and thrown out of doors for this simple cause, when in fact, it was no fault of the furnace, but only ignorance in arranging one of its necessary appendages — the fresh air box or duct.

Another and very powerful heating apparatus is that used by the Hon. Henry Ruttan, of Cobourg, Canada, in his system of heating and ventilation. The apparatus is generally known as Ruttan's Air Warmer.*

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* This Air Warmer has been materially improved by B. R. Hawley, Esq., Normal, Ill. For information in reference to it, address, W. A. Pennell & Co., Normal, Ill.

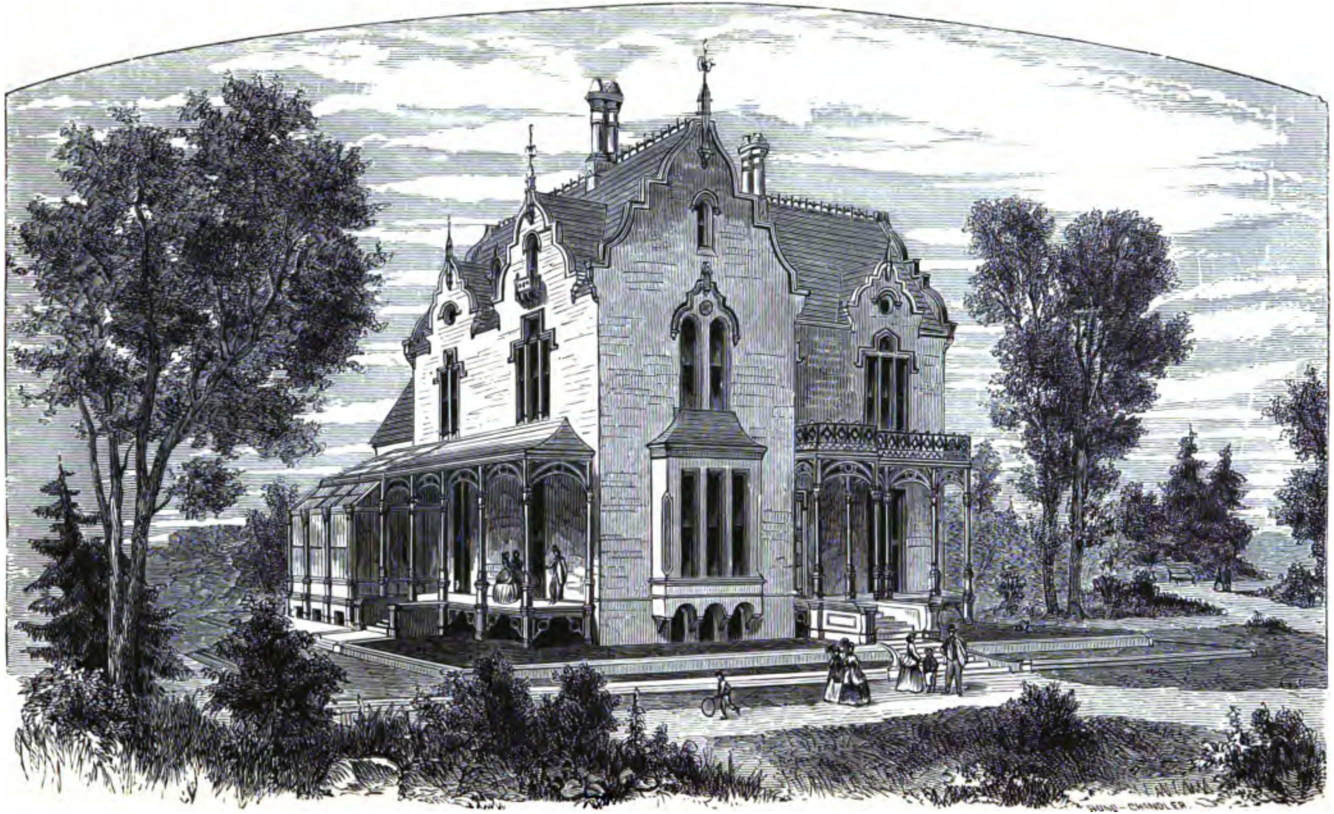
It is a serious defect in almost every species of hot air furnaces, especially where they are to be used as an auxiliary to ventilation, that they do not afford sufficient volume of pure and warm air; for without this no apartment can be well warmed and ventilated, however well and scientifically constructed the ventilating apparatus may be.

The best manner of introducing the pure, and distributing the hot air, dimensions of pipes, how and where they should be placed, and the numerous details that should be considered by an architect, will be fully explained, in their proper place, in the plans and specifications for each building in which they are to be used. They are ever varying, according to circumstances, and it is only by a careful study of the laws which govern the action of heat and cold, that one is enabled to direct the execution of such work to a successful termination.

Let us now consider this subject, as related to

VENTILATION.

Without doubt one half of the human family die prematurely for want of pure air; while others drag through a life of misery and disease, simply because, through ignorance, or a willful disregard of the laws of their being, they fail to enjoy this, one of their Creator's greatest blessings. But, without attempting to dilate upon what the world *ought* to be, we will take it as we find it, greatly in want of ventilation, and proceed to consider some of the means by which the desired result may be accomplished. In the first place, it must be understood that ventilation, in cold weather, can not be produced without a loss of heat. This is an important consideration, and one that should not be lost sight of in considering the various plans in use for ventilating buildings; nor, also, this further fact, that artifi-



SUBURBAN RESIDENCE.---G. P. RANDALL, ARCHITECT.

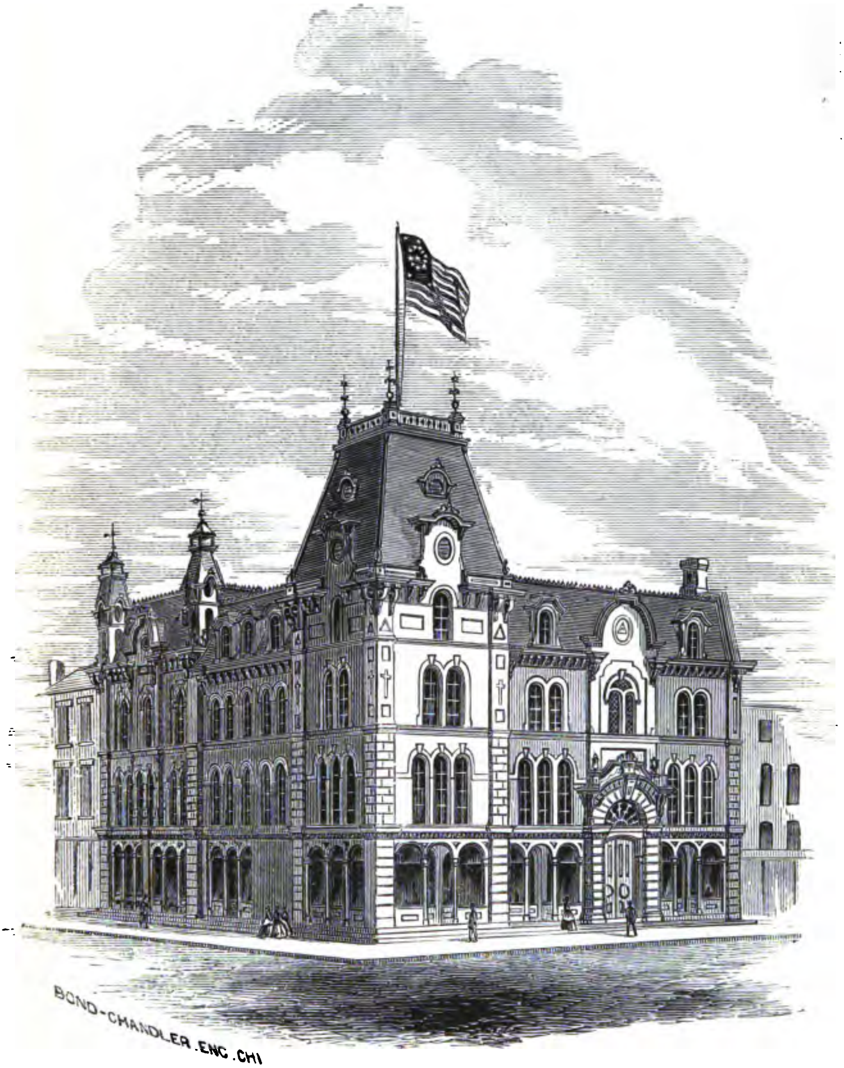
cial heat can not be produced by any known method, without incurring more or less expense. A movement, or change of air in a room, may be produced in a variety of ways, as, for instance, if the temperature be higher in the room than out of doors, by an opening in the ceiling, through which the air will escape, it being driven off by the greater pressure of the air from the outside rushing in beneath, for it should be understood that warm air does not *naturally* rise, but, when in contact with cold air it rises, by being forced up by the greater density and weight of the cold air. It may also be produced by a similar principle, applied to ventilating flues, and more thoroughly by the use of a fan.

One of the best and most reliable methods, where expense is not too important a consideration, is to heat with steam by coils of pipe in hot air chambers; then drive the pure, cold air into and through these chambers, by the use of fans, driven by steam. By this method a plentiful supply of warm, fresh air may be forced into the room, which, if proper openings be made for the exit of the foul air, will produce the necessary ventilation, at the same time that the room will be kept at a proper temperature for comfort.

As a general rule, and as a matter of economy, large churches and public halls should be ventilated at or near the floor; and for the reason that the warm, pure air, as it comes into the room, immediately goes to the ceiling, spreading itself in a kind of zone, throughout the highest space under the ceiling, and gradually settling down towards the floor, as it is exhausted from that point. Now, if there be a sufficient number of openings in the floor, or in the base close to the floor, all connected with a powerful exhausting shaft, with a plentiful supply of warm, fresh air flowing in through the heating apparatus, the air in the room will be kept not only warm, but perfectly fresh, and fit for respiration. This method will invariably prove a success if the heating apparatus is capable of furnishing a sufficient quantity of fresh warm air, and without which no room can be properly warmed and ventilated at the same time.

One of the advantages in the use of a fan, is, that in the summer, the steam that heats the coils in the hot air chambers, may be turned off, when the fan will drive the *cool*, fresh air into the room, through the same channels provided for the heated air. This is the method usually adopted for large buildings, such as State Capitols, Asylums, and such buildings as must necessarily have a plenty of fresh air, however great the expense.

The next best method — and one the expense of which need not prevent its general use in churches, school-houses, colleges, dwellings, and most other buildings — is to use the exhausting shaft, without the fans, connecting it with the floor or base (as before described), and produce the necessary movement of the air by artificial heat in the shaft. If the shaft be a small one, this may sometimes be produced by connecting the smoke pipes from the furnaces or boilers, with a vertical pipe passing up through the shaft, by which means the air in the shaft will be rarified by heat radiated from the smoke pipe. As a general rule, if the shaft be of considerable dimensions, the heat radiated from such a pipe will not be sufficient to produce the necessary draft, and in such case a stove may be set into the lower end of the shaft in the air passage, when it will be found to work admirably. But if a sufficient supply of fresh, warm air, shall be injected into the room, the foul air will pass off through the exhausting shaft or shafts without further trouble. This main shaft, connecting, as it should, with the rooms by ducts under each floor, or by down flues



BUSINESS BLOCK. - - - G. P. RANDALL, ARCHITECT.

No. 30.

connecting with ducts under the cellar floor, will produce the most excellent ventilation, the best perhaps that can be made without the use of a fan. This method is peculiarly well adapted to the ventilation of school buildings, though perhaps of eight in every ten they will so far neglect to supply the necessary fresh air for the room as to render the ventilating apparatus nearly useless.

When heating by hot air it is of little matter where the air enters the room, whether at or near the floor, or near the ceiling, or at some intermediate point. Wherever it may enter it will go at once to the ceiling, and diffuse itself throughout the highest space in nearly a level zone, unless interfered with by wind currents from some other source; nor does it matter materially whether it enters at one point or another, or several points. There are, however, important reasons in connection with the mechanical working of the heating apparatus which should be considered in determining where the hot air should enter the room, and I will name one as an illustration. If the building has two or more stories in height, and the hot air generator be set in the cellar, it would be a natural conclusion for a person not minutely acquainted with the subject, to suppose that to warm the lower rooms the hot air should enter through a register set in the floor, and the room above through a pipe passing up through a partition or wall to a register in the wall or floor of the upper room. Now the power—or draft, as it is usually termed—of such a current depends on the height of the vertical column of air confined within the pipe or conduit, and as in one case there would be only some two or three feet, and in the other from four to six times as much, the result would be that the draft would be so much in excess to the upper room that very likely it would take the heat all away from the room below, and should the supply of fresh air from its legitimate source be deficient, the furnace would supply the upper room by taking it from the lower one, and that, too, through the pipe and register that should supply the lower room with warm fresh air.

How can this be remedied? It can be done by extending the hot air pipe that supplies the lower room up so that it may enter just below the ceiling, thereby making the pipes to the two stories nearly of the same length, when they will be found to serve each room in a more equitable manner. There are other methods by which the same thing may be accomplished, but this will serve to illustrate how easily an inexperienced operator may totally destroy the working of what would otherwise be a good heating apparatus; and it also indicates the penalty that must be suffered if, for the sake of false economy, one employs unskillful and incompetent men to plan and direct such work.

There are several methods for producing ventilation without dependence upon artificial heat; as, for instance, by the aid of injecting and ejecting ventilators set upon the roof, and communicating with the rooms below. Of these, Emerson's ejector has been long and favorably known as a mechanical construction peculiarly well adapted to its use, but these are not always proof against rain, though this objection would have little weight when the ventilator is to be set upon the top of a brick shaft.

A volume might be written in enumerating the many peculiarities in the arrangement of heating and ventilating apparatus, but the foregoing must suffice. An excellent treatise on this subject has been published by Mr. Ruttan, elsewhere referred to, wherein he has handled the subject in a practical way, and by the aid of a series of diagrams has exemplified the true principles of ventilation in a much more clear and comprehensive manner than has been done by any author preceding him; though in regard to some of his ideas about *building*, a Yankee reader might possibly dissent.

But with all the treatises extant no one should attempt to lay out or design such work who has not had large practical experience; for the numerous and almost certain failures that take place in such work, when entrusted to unskillful hands, is sufficient evidence that it is the work of a life-time to fully understand it.

CONCLUSION.

In conclusion, I would respectfully invite clergymen, whose congregations are about to build houses for public worship, and have not procured their plans; supervisors and other county officers, who have the direction and control of the erection of public buildings; or private individuals, who are about to build for themselves, to send me their address, with a brief description of what they propose to build, and I will send them plans for inspection and return, with no other expense than express charges each way, provided they do not use them to my disadvantage, by copying or exhibiting them to others who make such drawings; and with this further qualification, that I can not always spare the time to make new designs especially for cheap buildings, unless I have a definite order.for plans, but will send such as I have, if any thing like what is wanted, and which will show something of the character of my work.

I desire particularly to say to county supervisors or county courts, commissioners, and building committees generally, who have the responsibility of procuring plans for public buildings, that I have a great variety of designs for such buildings in my office, as complete in all their arrangements as could be desired, and ranging in cost from fifty to five hundred thousand dollars.

On being informed of the time of meeting of any board of supervisors, or commissioners, who desire to examine such plans with a view of selecting a design for adoption, I will go with or send the designs to such parties, and give them as good an opportunity to select a superior design as they would have in a competition; and should the plans which I might present fail to give satisfaction, they can then resort to competition or an other means to obtain them.

Any public officer or private individual to whom this pamphlet may be sent, or into whose hands it may fall, will confer a favor by sending me any information they may have in reference to the erection of such buildings.

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